OMRON

FOR SEMI STANDARD-COMPATIBLE CIDRW SYSTEM

USER'S MANUAL

CIDRW Controller

Model V700-L21

ID Link Unit

Model V700-L11

IDRW Head

Model V700-HMD13□
Model V700-HMD11-1

ID Tag

Model V700-D23P41

OMRON Corporation

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Catalog No. Z214-E1-01B

Introduction

Thank you for purchasing the OMRON product.
To be able to operate the product safely and efficiently, carefully study this user's manual and get fully familiar with the instruction in it before attempting to use the product. Keep this manual at hand for speedy reference while operating, maintaining or servicing the equipment.

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Meanings of Signal Words

The following signal words are used in this manual.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally, there may be significant property damage.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Meanings of Alert Symbols

The following alert symbols are used in this manual.

	Indicates general prohibitions for which there is no spacific symbol.
	Indicates instruction for the user to always connect the ground wire.
	Indicates prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.

Alert statements in this Manual

The following alert statements apply to the products in this manual. Each alert statement also appears at the locations needed in this manual to attract your attention.

⚠ WARNING	
	This product is not designed to be used either directly or indirectly in applications that detect human presence for the purpose of maintaining safety. Do not use this product as a sensing device for protecting human lives.

⚠ CAUTION	
	Do not disassemble the Unit or touch the internal parts of the Unit while the power is turned ON. Doing so may result in electric shock due to the high-voltage internal parts.
	The GR (frame ground) terminal is in the multi-connection port. Always ground the multi-connection port to 100 Ω or less, regardless of whether it is used or not. Performance may deteriorate if the port is not ground.

Precautions for Correct Use

To operate the CIDRW system more reliably and to allow the system to fully perform as designed, follow the instructions below:

■ About environments of installation

Do not install or leave the product to a location such as:

- Location subjected to direct sunlight
- Location where corrosive gas, dust, metal dust, salty air is present
- Location where the operating temperature can exceed or drop below a range defined in the specification
- Location where temperature change is great, and can lead to dew condensation
- Location with higher humidity, and can lead to dew condensation
- Location where vibration or impact whose magnitude is greater than specified can be directly transmitted to the product proper
- Location where splash of water, oil or chemical product is present

■ About installation

- This product operates on the 125 kHz frequency band to communicate with an ID tag. Certain transceivers, motors, monitors, and power supplies (power ICs) can emit a radio frequency wave (noise) that can adversely affect communications with an ID tag. When planning to use the product near such a source, study the possible result in advance.
- To minimize the possible noise interference, earth-ground (class D earth work) a metal object that will be located around the product.

■ About wiring work

- Be sure to earth-ground the setting terminal per class D earth work. Otherwise, the product will not perform as designed.
- Before starting a wiring work or disconnecting a cable, be sure to power OFF the product.
- Do not run the cable for the product in a conduit common to a high voltage line and a power supply line.
- To avoid static-induced failure, wear a wrist band or equivalent means to release a static charge before touching a terminal or a signal line within a connector.

■ About thread glue

- A thread glue can deteriorate and lead to crack on a resin part. Thus, do not apply a thread glue to the threading on a resin part or to resin-made washers.

■ About cleaning

- NEVER use an organic solvent such as thinner or benzene, as it will attack resin components or case coating.

Limitations about Model V700-HMD13

When a Model V700-HMD13 (not Model V700-HMD13□) is used to configure a CIDRW system, there will be the operating limitations described below.

<Description of limitations>
Data read (S18F5/F6) and data write (S18F7/F8) by single segments are possible only with data segments assigned to **pages 1 through 12** within the memory page1 1 through 30 on an ID tag. Note that data read/write is possible with a read or write operation with all the segments as a block.

A CIDRW system configuration using Model V700-HMD13A will serve free of the above-mentioned limitations.

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System Configuration and Features

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1.1 System configuration

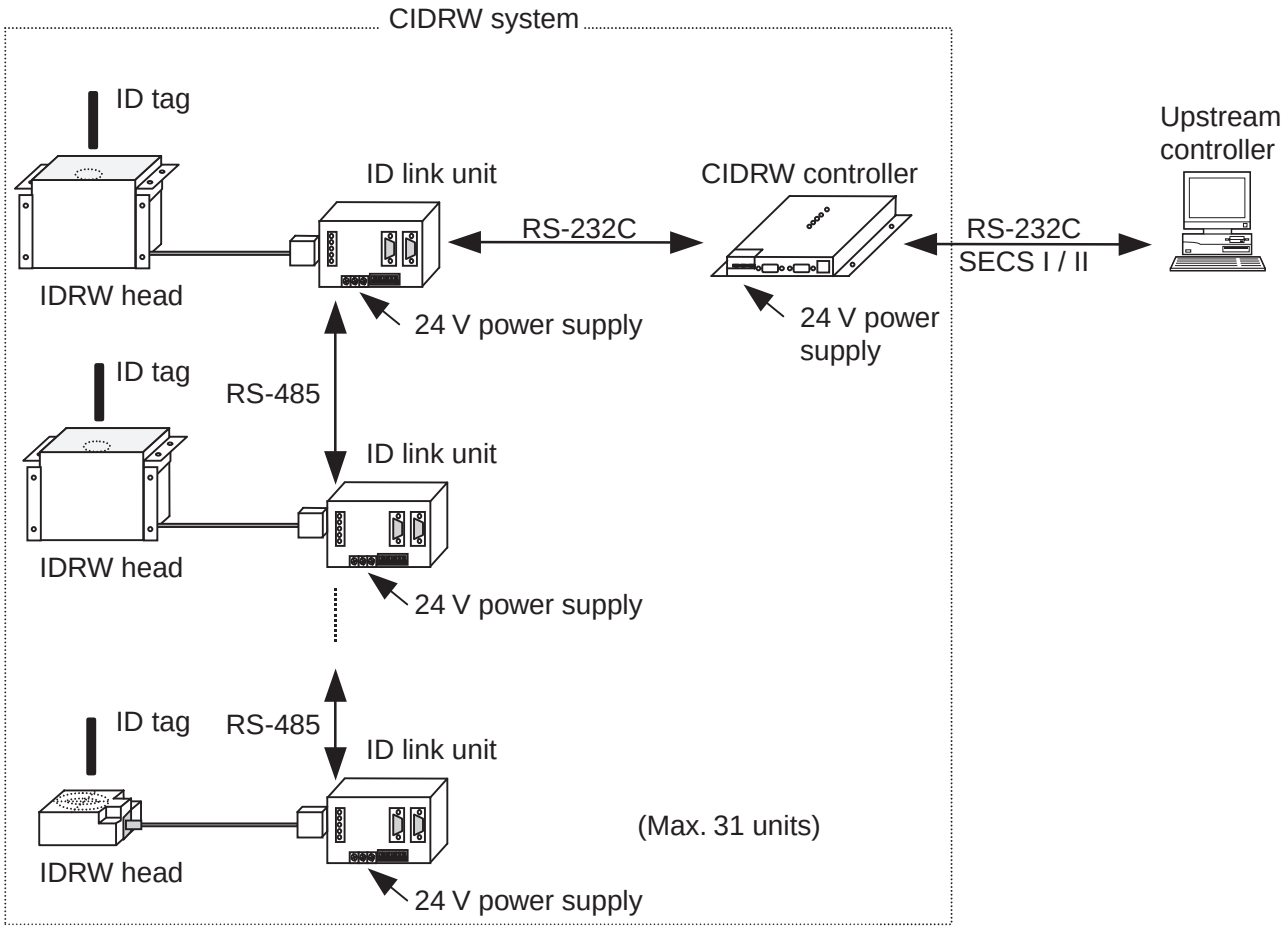
OMRON's CIDRW (Carrier ID Reader/Writer) is an RFID system that conforms to SECSs (SEMI Equipment Communications Standards, where SEMI stands for Semiconductor Equipment and Materials International), and which comprises Model V700-L21 CIDRW controller, Model V700-L11 ID link unit, Model V700-HMD13☐ or V700-HMD11-1 ID R/W head, and Model V700-D23P41 ID tag. The normative SECSs for the system include:

- SEMI E99 THE CARRIER ID READER/WRITER FUNCTIONAL STANDARD
- SEMI E5 SEMI EQUIPMNT COMMUNICATIONS STANDARD 2 MESSAGE CONNECT (SECS II)
- SEMI E4 SEMI EQUIPMENT COMMUNICATIONS STANDARD 1 MESSAGE TRANSFER (SECS I)

CIDRW system configuration

* SEMI: Semiconductor Equipment and Materials International

* SECS: SEMI Equipment Communications Standard



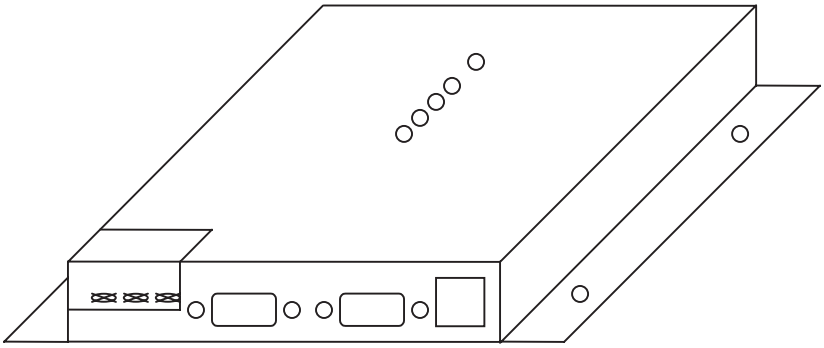
For detailed information about the above-mentioned standards, contact SEMI addressed at:
805 East Middlefield Road, Mountain View, CA 94043

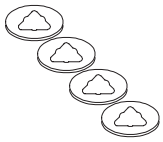
1.2 Features

OMRON's SEMI standard-conforming CIDRW system is configured with the following units:

● Model V700-L21 (CIDRW controller)

This unit is linked with upstream equipment (upstream controller, etc.) in accordance with SECS I/II-compatible protocol and controls the CIDRW system. Being driven by a 24 VDC power supply, it is linked to one or more ID R/W heads via a link unit. It is delivered together with four lock washers for reliably installing it.

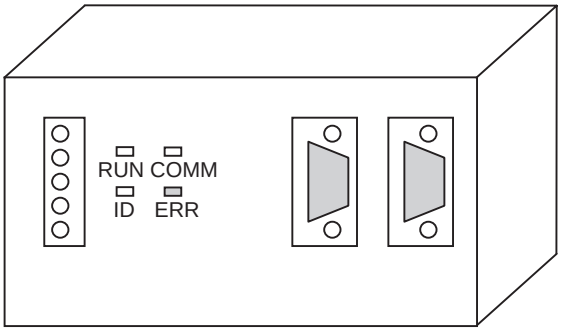


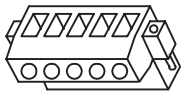


4 washers

● Model V700-L11 (ID link unit)

This unit allows one or more ID R/W heads to be linked to the CIDRW controller unit, and will be here-under simply called "link unit". Being driven by a 24 VDC power supply, it supplies 5 VDC power to the ID R/W heads. When delivered, it includes connectors (COMBICON screw-down plug: Model XW4B-05C1-H1-D) for multi-connection ports.





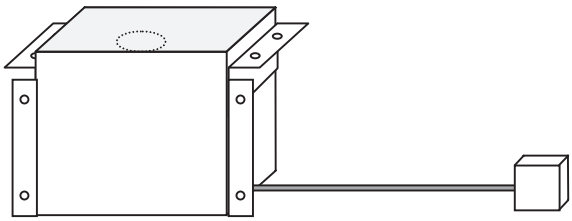
Connector for multi-connection port

● Model V700-HMD13☐, or V700-HMD11-1 (ID R/W head)

An ID R/W head reads or writes data from or into the memory on ID tag without a need to contact the ID tag. It will be hereunder simply called IDRW head (or, more simply, IDRWH). It is operated as linked to the CIDRW controller via a link unit.

Two differently formed IDRW head types are available:

① Model V700-HMD13☐ features a form and data transaction performance suitable for the "undocked position" per SEMI standards.

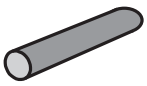


② Model V700-HMD11-1 features a form and data transaction performance suitable for the "docked position" per SEMI standards. It is delivered together with two mounting nuts.

Mounting nut (2 × M4)

● Model V700-D23P41 (ID tag)

This is a round rod type ID tag that measures 3.9 mm in diameter and 25 mm in length. It contains a memory space of 240 bytes that allows a user to read or write data from or into it.



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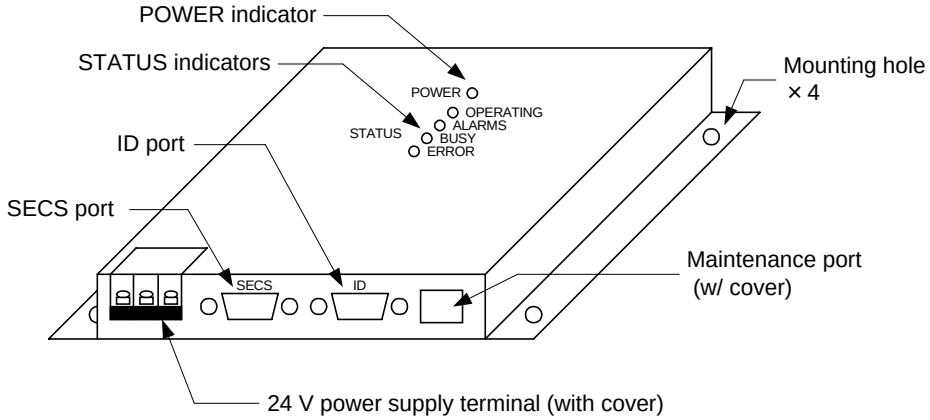
2.1 CIDRW controller: Model V700-L21

2.1.1 Names and functions of various components/specifications



- 24 V power supply terminal (with cover)

  A power terminal and a GR (frame ground) terminal, for supplying 24 VDC.

- SECS port

  A port for connection to upstream equipment (equipment controller, etc.). Conforms to SECS I/II.

- ID port

  A port for connection to a link unit that further connects to an IDRW head.

- Maintenance port (w/ cover)

  Not used. Do not remove the cover.

- POWER indicator

  An LED lamp that indicates whether or not the CIDRW controller is powered. It remains lit green when the controller is powered.

- STATUS indicators

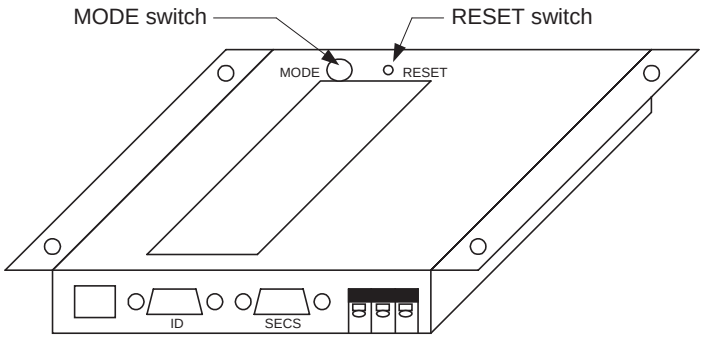
  Four indicator lamps (OPERATING, ALARMS, BUSY, ERROR) indicate the current operating status of the CIDRW controller.

  All of these LEDs either remain stably lit or flash immediately after the CIDRW controller is powered ON or during the initial stage of resetting of the controller.

OPERATING	Green	Lights when the state model of CIDRW is OPERATING.
ALARMS	Green	Lights when "Alarm Status" on the CIDRW is "1" (ALARMS).
BUSY	Green	Lights when "Operational Status" on the CIDRW is "BUSY".
ERROR	Red	Lights for 50 ms when a fault is detected (SSACK is not "NO") during service.

⚠ CAUTION

⏚	Be sure to ground the GR (frame ground) by class D earth work (grounding resistance of 100 Ω or less, diameter of grounding conductor of 1.6 mm or greater). Otherwise, the CIDRW controller may fail to perform as designed.



● MODE switch

This is a 8-position rotary switch that selects an intended operation mode. Available operation modes are normal operation mode and setup mode. The controller is factory-set to normal operation mode (0).

MODE SW position	Operation mode	Function
0	Normal operation mode	The controller serves as a CIDRW.
3	Setup mode	The operator can set up parameters.*
1, 2, 4, 5, 6, 7	Do not select these positions.	Reserved

* For the information about parameters, refer to Sec. 5.2 "How to set parameters".

● RESET switch

Using a pointed tool, depress this switch to reset the CIDRW controller. The controller will be reset to the original state that is same as a one occurring immediately after powering ON.

CHECK!

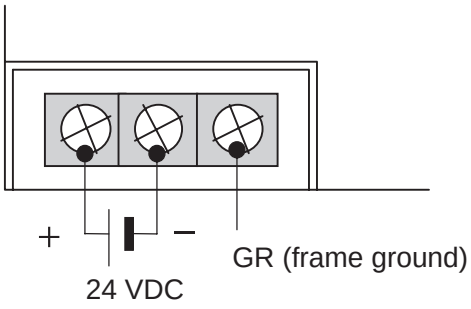
- When the CIDRW controller is powered ON, the mode specified by the MODE switch is automatically accessed. Remember that changing the MODE switch setting while the controller is running does not switch over the current operation mode. To enable another operation mode, power OFF and power ON again the CIDRW controller or press the RESET switch.
- NEVER attempt to select any of the illegal settings 1, 2, 4, 5, 6 and 7.

■ General specifications

Characteristic	Specification	Comment
Supply voltage	24 VDC, +10%, –15%	Supplied from the power terminals
Current consumption	150 mA max.	Approx. 10 A max. with rush current
Dimensions	150 × 167 × 28 mm	Except for protrusions on connectors
Protection class	IP20 (per IEC 60529)	
Operating ambient temperature	0 to +40°C	No freezing
Operating ambient humidity	10 to 85%RH	No dew condensation
Storage ambient temperature	-15 to +65°C	No freezing
Storage ambient humidity	10 to 95%RH	No dew condensation
Mounting system	Secured with four M4 screws.	Use the enclosed washers.

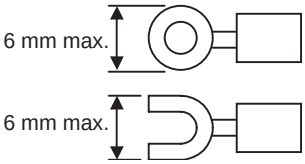
■ 24 V power terminals

The 24 V power terminals include the power terminals and frame ground terminal. Remove the cover, and make wiring connections. After the wiring work, reinstall the cover.



• Recommended 24 V power supply:
Model S82K-03024 (OMRON)

• For wiring connections, use compression rings.
• Use the M3 compression rings illustrated below.



CHECK!

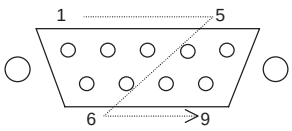
Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

2.1.2 Interface specifications

(1) SECS port

Characteristic	Specification				
Connector specification	9-pin D-SUB male connector with #4-40UNC lock screws				
Communication standard	RS-232C				
Synchronization	Asynchronous, start-stop synchronization				
Communications control standard	SEMI E4 SECS I, E5 SECS II				
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps (9600 bps is default; selectable in setup mode)				
Character format (E4 SECS I, fixed)	Start bit	Data bit	Parity bit	Stop bit	Total
	1	8	None	1	10
Total cable length	15 m max.				

(Pin arrangement)



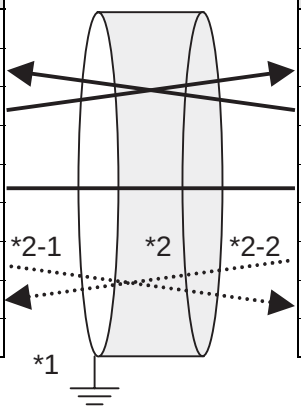
Pin No.	Signal name	Symbol	Direction	Comment
1		<N.C.>		Unused
2	Receive data	RD	Input	
3	Send data	SD	Output	
4	–	–	Output	Normally OFF
5	Signal ground	SG	–	
6	–	–	Input	Leave this pin OPEN.
7	Request send	RS	Output	Normally OPEN during service
8	Clear to send	(CS)	Input	Not functioning
9		<N.C.>		Unused

■ Cable connection example

<Connection with DOS/V PC>

Connect the upstream controller to the CIDRW controller using the cable whose configuration is specified below. Limit the whole cable length to 15 m.

DOS/V PC D-SUB 9-pin socket #4-40	Symbol	Pin No.
		1
	RD	2
	SD	3
		4
	SG	5
		6
	RS	7
	CS	8
		9



Pin No.	Symbol	CIDRW controller D-SUB 9-pin socket #4-40
1		
2	RD	
3	SD	
4		
5	SG	
6		
7	RS	
8	CS	
9		

*1 Ground the shielded cable either on the PC/AT side or CIDRW controller side.

*2 The controller can run without a wiring between RS and CS. Note, however, that a wiring connection from RS to CS(*2-2)enables verification of correct connection with the CIDRW system. Furthermore, with an additional connection from RS to CS(*2-1),the directionality of cable will be lost.

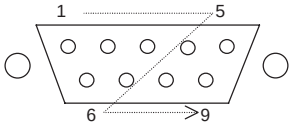
- Recommended cable: CO-MA-VV-SB 5PX28AWG (Hitachi Cable, Ltd.)
- Recommended connector: socket-Model XM2D-0901 (OMRON), hood-Model XM2S-0913 (OMRON)

CHECK! Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

(2) ID port

Characteristic	Specification
Connector specification	9-pin D-SUB connector plug with #4-40UNC lock screws
Communication standard	RS-232C
Baud rate	9600, 19200, 38400 bps (9600 bps is default; selectable in setup mode)
Total cable length	15 m max.

(Pin arrangement)

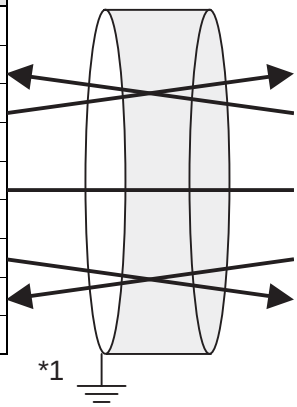


Pin No.	Signal name	Symbol	Direction	Comment
1	–	–	Input	Leave this pin OPEN.
2	Receive data	RD	Input	
3	Send data	SD	Output	
4	–	–	Output	Normally OFF
5	Signal ground	SG	–	
6	–	–	Input	Leave this pin OPEN.
7	Request send	RS	Output	
8	Clear to send	CS	Input	For verifying established link
9	–	–	Input	Leave this pin OPEN.

● Connection with link unit

Connect the CIDRW controller to the link unit using the cable whose configuration is specified below. Limit the whole cable length to 15 m.

	Symbol	Pin No.		Pin No.	Symbol	
CIDRW controller D-SUB 9-pin socket #4-40		1		1		Link unit D-SUB 9-pin socket #4-40
	RD	2		2	RD	
	SD	3		3	SD	
		4		4		
	SG	5		5	SG	
		6		6		
	RS	7		7	RS	
	CS	8		8	CS	
		9		9		

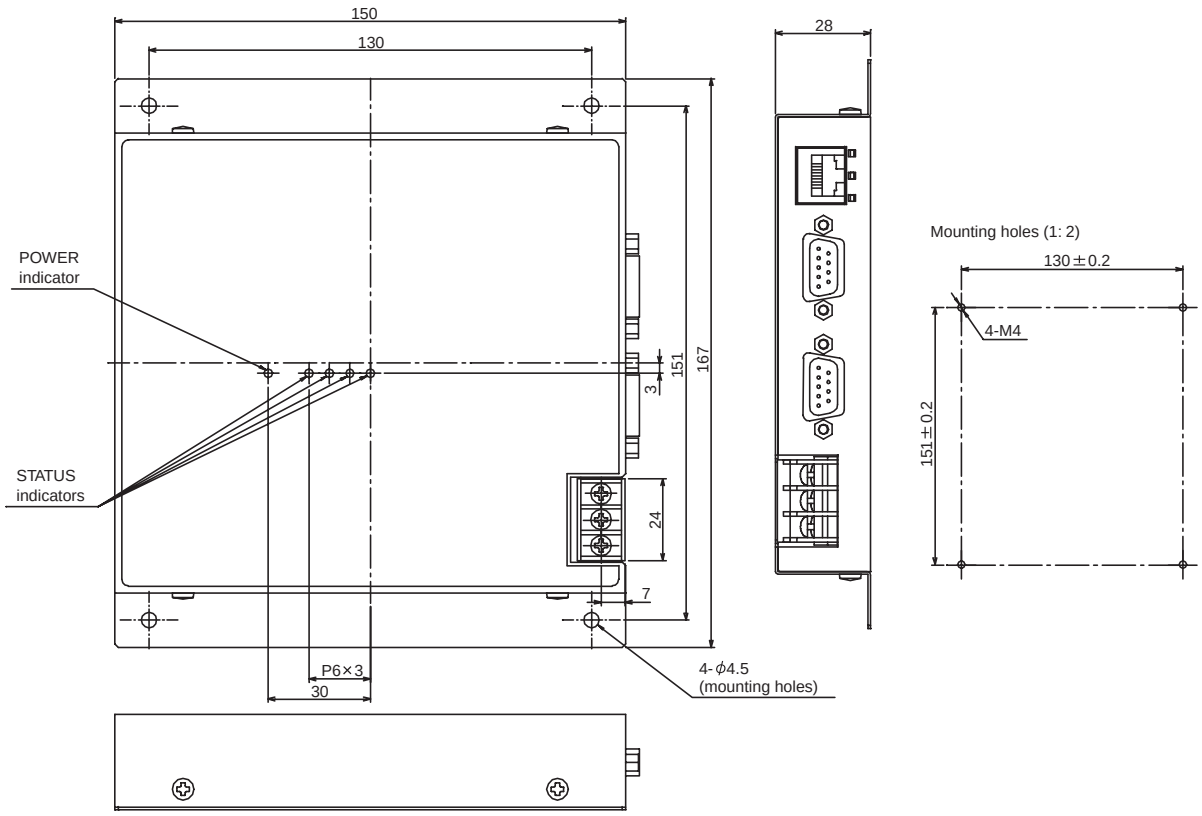


*1 Ground the shielded cable either on the CIDRW controller side or link unit side.

- Recommended cable: CO-MA-VV-SB 5PX28AWG (Hitachi Cable, Ltd.)
- Recommended connector: socket-Model XM2D-0901 (OMRON), hood-Model XM2S-0913 (OMRON)

CHECK! Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

2.1.3 Dimensional drawing and mounting method

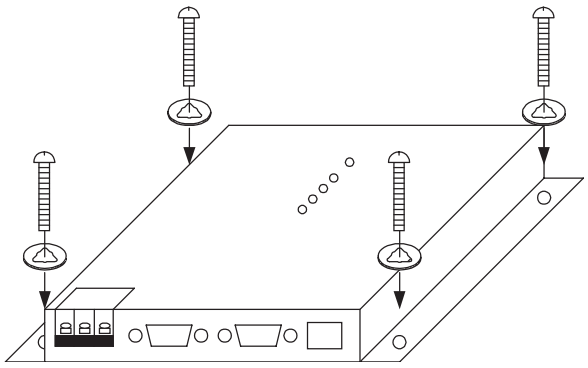


Case material	Steel sheet (SPCC-P)

(Unit: mm)

● Mounting method

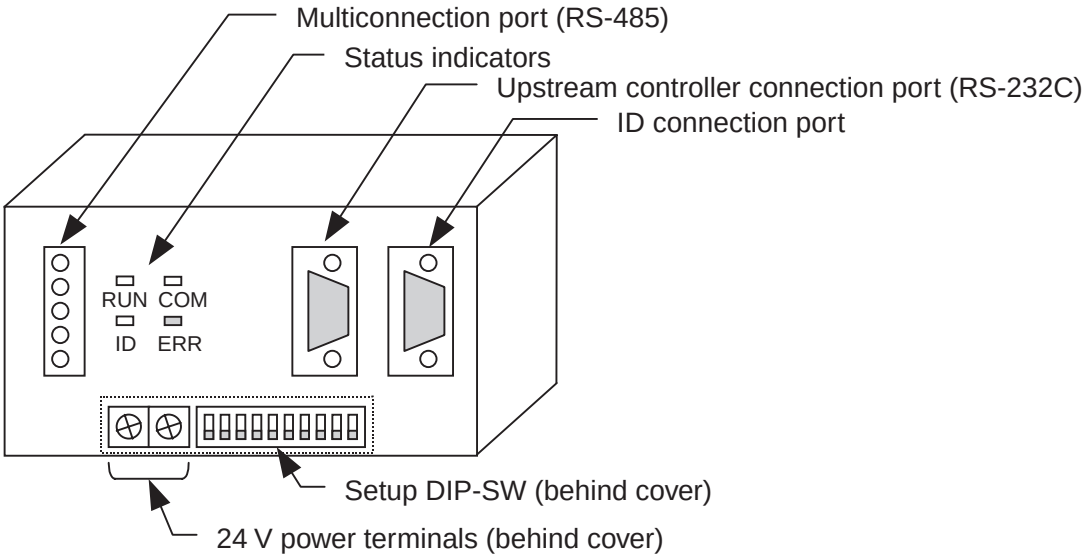
Install the controller using the four mounting holes and four M4 screws together with the enclosed washers.



* Be sure to limit the tightening torque for the M4 screws to 1.2 N-m or less.
* Do not apply an organic solvent such as thread glue to the threads.

2.2 Link unit: Model V700-L11

2.2.1 Names and functions of various components/specifications



● Upstream controller connection port (RS-232C)

This port is for connection to the CIDRW controller according to RS-232C interface standard, and a dust cover has been factory-installed to it. Remove the cover before operating the link unit.

● Multiconnection port

If two or more IDRW heads are connected to the CIDRW controller, connect this port to a multiconnection port on another link unit. This port contains a GR (frame ground) terminal.

● ID connection port

A port dedicated to connection of an IDRW head-either Model V700-HMD13☐ or Model V700-HMD11-1.

● Setup DIP-SW

This switch array allows the operator to assign ID Nos. to IDRW heads and define various operating conditions.

● Status indicators

Four indicator lamps (RUN, COMM, ID, ERR) indicate the current operating status of the link unit.

RUN	Remains stably lit as long as the link unit is operating normally.
COMM	Remains lit during data transaction with an upstream controller.
ID	Remains lit during data transaction with an IDRW head.
ERR	Lights when a fault is detected during data transaction with an upstream controller or IDRW head.

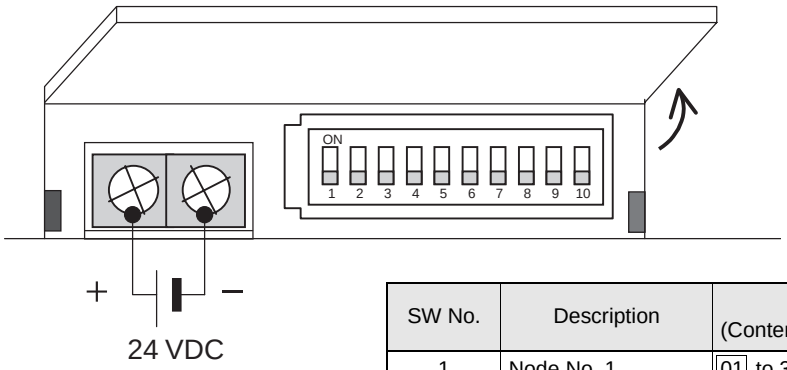
⚠ CAUTION	
	Regardless of whether or not the multiconnection port is used, be sure to ground the GR (frame ground) by class D earth work (grounding resistance of 100 Ω or less, diameter of grounding conductor of 1.6 mm or greater). Otherwise, the link unit may fail to perform as designed.

■ General specifications

Characteristic	Specification	Comment
Supply voltage	24 VDC, +10%, –15%	Supplied from the power terminals
Current consumption	250 mA max.	Approx. 10 A max. with rush current
Dimensions	110 × 65 × 64 mm	Except for mounting hook
Protection class	IP20 (per IEC 60529)	
Operating ambient temperature	0 to +40°C	No freezing
Operating ambient humidity	35 to 85%RH	No dew condensation
Storage ambient temperature	–15 to +50°C	No freezing
Storage ambient humidity	35 to 85%RH	No dew condensation
Mounting system	Secured with two M4 screws	

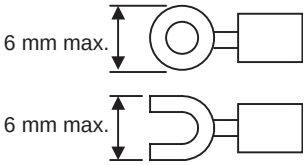
■ 24 V power terminals/setup DIP-SW

Open the cover to access 24 V power terminals and setup DIP-SW. Then, make necessary wiring connections. After the connection work, reclose the cover.



SW No.	Description	Meaning (Content within a box □ represents factory-setting)
1	Node No. 1	01 to 31 No. 1 is LSB, and No. 5 is MSB. (For correspondence between DIP-SW settings and node Nos., see the table in the next page.)
2	Node No. 2	
3	Node No. 3	
4	Node No. 4	
5	Node No. 5	
6	Baud rate setting 1	38400/19200/9600/4800bps [ON,ON] [ON,OFF] [OFF,OFF] [OFF,ON] :[No7,No6]
7	Baud rate setting 2	
8	Reserved	Always leave in OFF position.
9	Reserved	ReservedAlways leave in OFF position.
10	RS-485 terminator	ON/OFF

- For wiring connections, use compression rings.
- Use the M3 compression rings illustrated below.



- Recommended 24 V power supply: Model S82K-03024 (OMRON)

- Set the Baud rate on the link unit to that on the ID port of Model V700-L21 CIDRW controller.
- Set the RS-485 terminator setting to ON for the link units on both ends of multidrop, and to OFF for other units. If only one link unit is operated, set the terminator setting to OFF.

CHECK!

Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

• Assign a unique node No. to an IDRW head within a given subsystem. A node No. defined with this DIP-SW is taken as a "Head ID" (E99).

[DIP-SW setting vs. Node No. correspondence table]

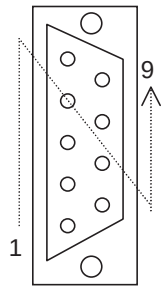
Switch No. in setup DIP-SW					Node No. (= "Head ID")
1	2	3	4	5	
OFF	OFF	OFF	OFF	OFF	01
ON	OFF	OFF	OFF	OFF	02
OFF	ON	OFF	OFF	OFF	03
ON	ON	OFF	OFF	OFF	04
OFF	OFF	ON	OFF	OFF	05
ON	OFF	ON	OFF	OFF	06
OFF	ON	ON	OFF	OFF	07
ON	ON	ON	OFF	OFF	08
OFF	OFF	OFF	ON	OFF	09
ON	OFF	OFF	ON	OFF	10
OFF	ON	OFF	ON	OFF	11
ON	ON	OFF	ON	OFF	12
OFF	OFF	ON	ON	OFF	13
ON	OFF	ON	ON	OFF	14
OFF	ON	ON	ON	OFF	15
ON	ON	ON	ON	OFF	16
OFF	OFF	OFF	OFF	ON	17
ON	OFF	OFF	OFF	ON	18
OFF	ON	OFF	OFF	ON	19
ON	ON	OFF	OFF	ON	20
OFF	OFF	ON	OFF	ON	21
ON	OFF	ON	OFF	ON	22
OFF	ON	ON	OFF	ON	23
ON	ON	ON	OFF	ON	24
OFF	OFF	OFF	ON	ON	25
ON	OFF	OFF	ON	ON	26
OFF	ON	OFF	ON	ON	27
ON	ON	OFF	ON	ON	28
OFF	OFF	ON	ON	ON	29
ON	OFF	ON	ON	ON	30
OFF	ON	ON	ON	ON	31
ON	ON	ON	ON	ON	Prohibited

2.2.2 Interface specifications

(1) Upstream controller connection port

Characteristic	Specification
Connector specification	9-pin D-SUB connector plug, with #4-40UNC lock screws
Communication standard	RS-232C
Baud rate	38400, 19200, 9600, 4800 bps (selectable with DIP-SW)
Total cable length	15 m max.

(Pin arrangement)



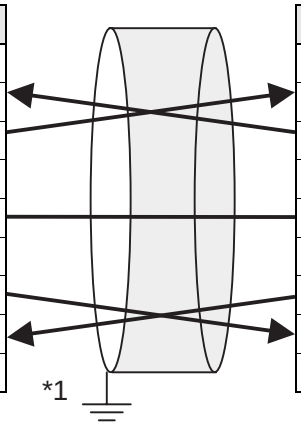
Pin No.	Signal name	Symbol	Direction	Comment
1				
2	Receive data	RD	Input	
3	Send data	SD	Output	
4	–	–	–	
5	Signal ground	SG	–	
6				
7	Request send	RS	Output	Normally OPEN during service
8	Clear to send	CS	Input	
9	–	–	–	

NOTE: The base of connector does not continue to the GR (frame ground).

<Connection with CIDRW controller>

Connect the link unit to the CIDRW controller using the cable whose configuration is specified below. Limit the whole cable length to 15 m.

	Symbol	Pin No.
CIDRW controller D-SUB 9-pin socket #4-40		1
	RD	2
	SD	3
		4
	SG	5
		6
	RS	7
	CS	8
		9



Pin No.	Symbol	
1		Link unit D-SUB 9-pin socket #4-40
2	RD	
3	SD	
4		
5	SG	
6		
7	RS	
8	CS	
9		

*1 Ground the shielded cable either on the CIDRW controller side or link unit side.

- Recommended cable: CO-MA-VV-SB 5PX28AWG (Hitachi Cable, Ltd.)
- Recommended connector: socket-Model XM2D-0901 (OMRON), hood-Model XM2S-0913 (OMRON)

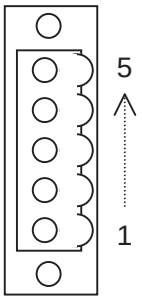
CHECK!

Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

(2) Multiconnection port

Characteristic	Specification
Connector specification	5-pin special connector (built into the link unit)
Communication standard	RS-485
Baud rate	38400, 19200, 9600, 4800 bps (selectable with DIP-SW)
Total cable length	50 m max.

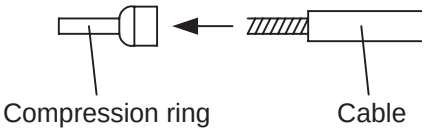
(Pin arrangement)



Pin No.	Name	Comment
5	–	Internally connected to pin 2.
4	+	Internally connected to pin 1.
3	GR	Frame ground
2	–	Internally connected to pin 5.
1	+	Internally connected to pin 4.

• Recommended cable
RS-485 signal line: Tatei Densen MVVS 2CX0.5SQ
Frame ground line: Cable rated at AWG 22 to 20

• Recommended compression ring
Phoenix Contact AI0.5-8WH



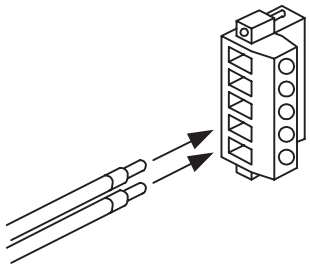
Insert the cable and crimp.

* The following product is recommended as a compression ring for connecting two cables to one terminal.
Phoenix Contact AI-TWIN2×0.5-8WH

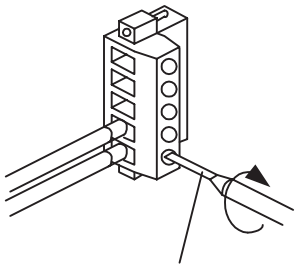
Use the product below as a crimping tool for crimping the compression ring.
Phoenix Contact CRIMPFOX UD6

■ How to connect cables

① Fit a compression ring to the stripped section of each cable.
Next, being sure of the connector orientation, insert each cable into a corresponding hole on the connector.

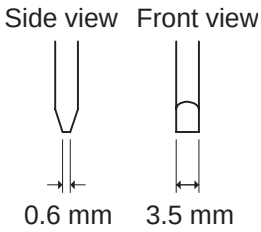


② Securely fasten each cable using the cable locking screw on the connector.
An ordinary screwdriver whose shank is tapered at the tip does not go all the way into the hole. Use a miniature flat-blade screwdriver with a straight shank.
Tighten the cable locking screws at an appropriated tightening torque (approx. 0.5 N-m).

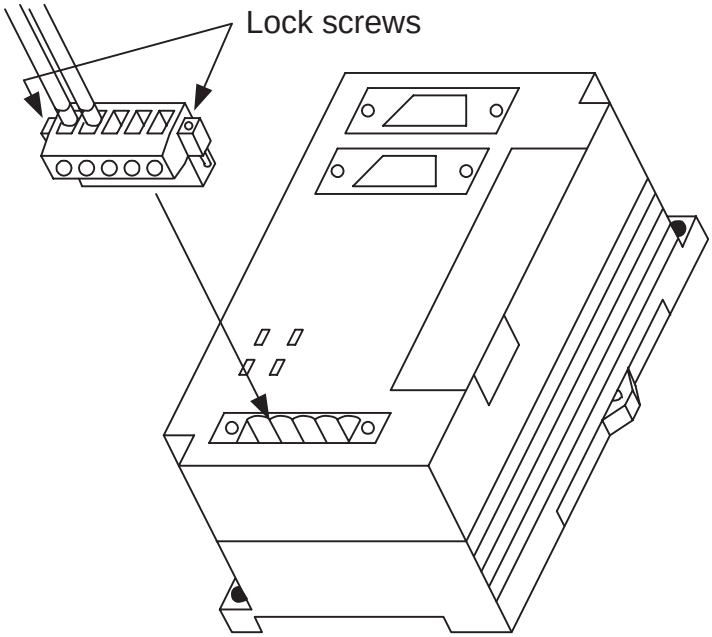


Miniature flat-blade screw driver with straight shank

The following purpose-built screwdriver is available:
OMRON: Model XW4Z-00C
Form of tip

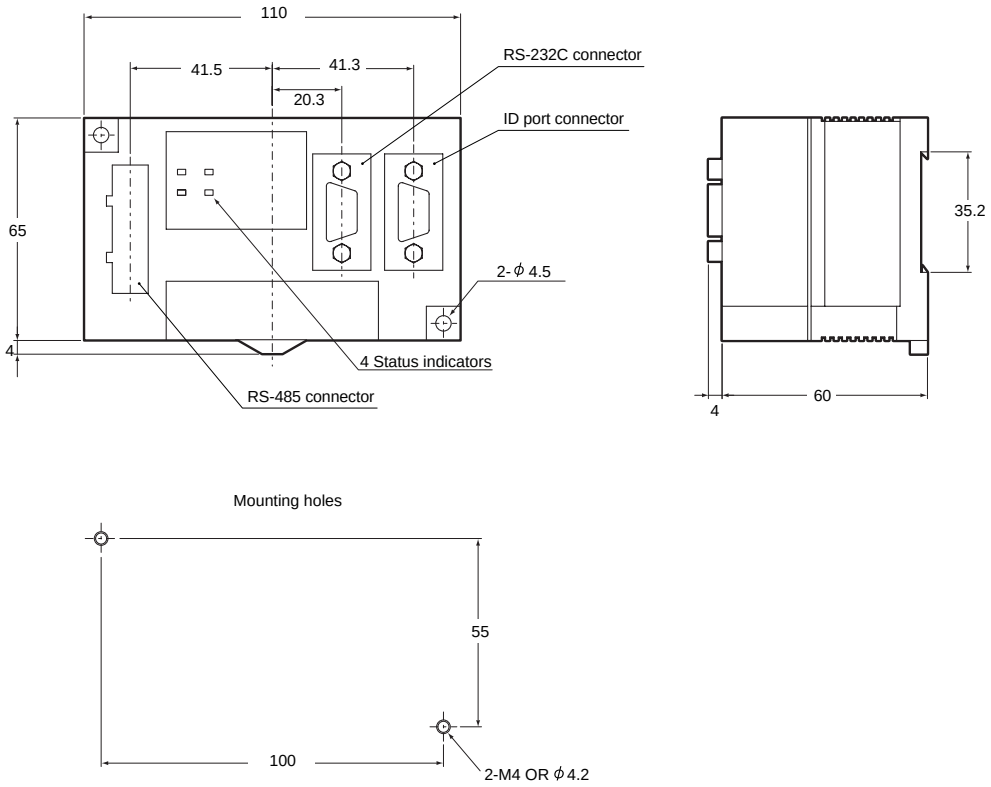


③ Connect the connector to the link unit together with the cables.
Match the orientation of link unit side connector with that of cable side connector, insert the cable side connector all the way, and then tighten the connector lock screws.



④ When removing the connector, fully loosen the two lock screws and draw out it straight by holding the protrusions on connector. If the connector does not easily come loose, draw it out while holding down the link unit proper.

2.2.3 Dimensional drawing and mounting method



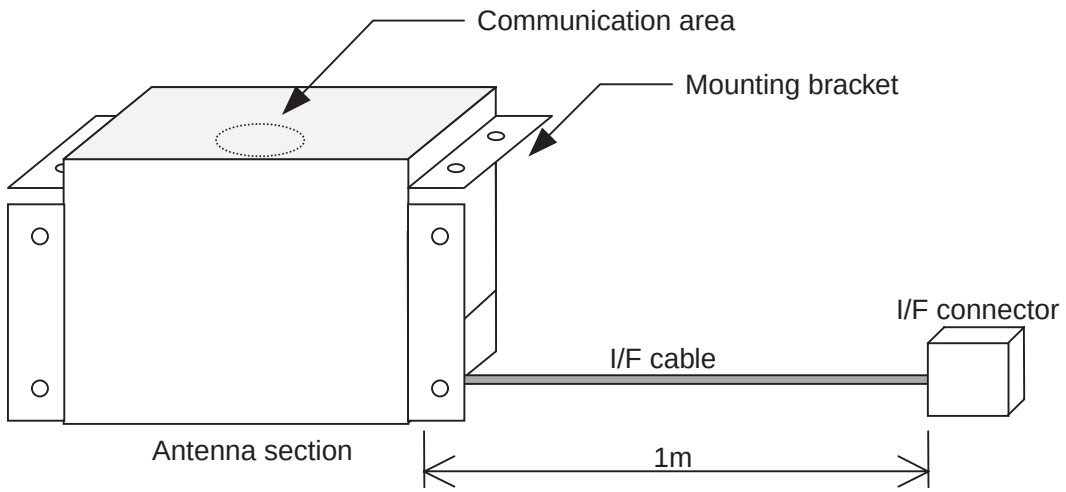
Case material	PC/ABS resin

(Unit: mm)

* Be sure to limit the tightening torque for the M4 screws to 1.2 N-m or less.
Do not apply an organic solvent such as thread glue to the threads. Otherwise, cracking can occur on the case.

2.3 IDR/W head: Model V700-HMD13□

2.3.1 Names and functions of various components/specifications



● Antenna section

This section reads or writes data from or into an ID tag.

● Mounting bracket

This bracket is for securing the antenna section. The vertical position of the mounting bracket can be adjusted in a range of 0 to 45 mm.

● I/F connector

This interface connector supplies power to IDR/W head, and permits data transmission with an upstream controller.

■ General specifications

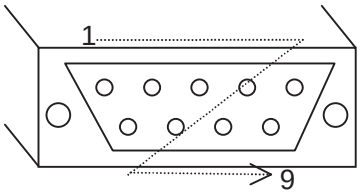
Characteristic	Specification	Comment
Supply voltage	5 VDC±5%	Supplied from the I/F connector
Current consumption	400 mA max.	When 5 VDC is input: approx. 8 A with rush current
Dimensions	44.8 × 149.8 × 73 mm	Except for cable
Cable length	1 m (dia. 6 mm)	Can be extended to 4 m in conjunction with Model V700-L11
Protection class	IP30 (per IEC 60529)	
Operating ambient temperature	0 to +40°C	No freezing
Operating ambient humidity	35 to 85%RH	No dew condensation
Storage ambient temperature	–15 to +50°C	No freezing
Storage ambient humidity	35 to 85%RH	No dew condensation
Mounting system	Screwed down at four points.	Capable of mounting to sheet metal*

* Be sure to ground the sheet metal that accepts the IDR/W head by class D earth work (grounding resistance of 100 Ω or less, diameter of grounding conductor of 1.6 mm or greater).

2.3.2 Interface specifications (same as with Model V700-HMD11-1)

Characteristic	Specification
Connector specification	9-pin D-SUB connector plug, with M2.6 lock screws
Communication standard	RS-232C

(Pin arrangement)



Pin No.	Signal name	Symbol	Direction	Comment
1				
2	Send data	SD	Input	
3	Receive data	RD	Output	
4	Request send	RS	Input	
5	Clear to send	CS	Output	Normally ON
6	+5 V input	5V	Input	5 VDC±5%
7	0 V input	0V	Input	Internally connected to SG
8				
9	Signal ground	SG	–	Internally connected to 0V

<Connection with link unit>

The IDR/W head can be directly connected to the ID connection port on the link unit. When considering extending the cable, use the cable whose configuration is specified below. Limit the whole cable length to 4 m.

	Symbol	Pin No.		Pin No.	Symbol	
		1		1		
Link unit	SD	2	→	2	SD	IDRWH
	RD	3	←	3	RD	
D-SUB 9-pin plug M2.6	RS	4	→	4	RS	D-SUB 9-pin socket M2.6 nut
	CS	5	←	5	CS	
	5V	6	→	6	5V	
	0V	7	→ *	7	0V	
		8		8		
	SG	9	→	9	SG	

* For the 5 V/0 V power line, use a cable whose conductor size is AWG22 or greater.

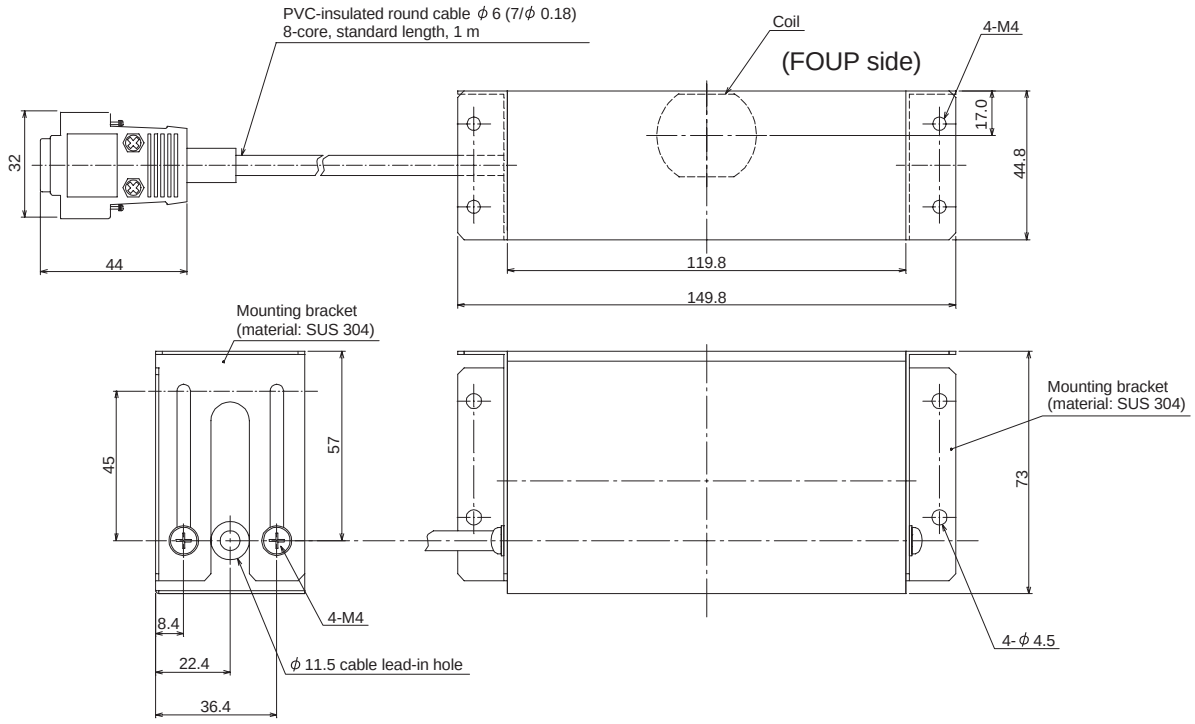
- Recommended cable:OTSC-8PVB-2 No. 22AWG (Onamba)
- Recommended connector: <IDRWH side> socket-Model XM2D-0901 (OMRON),
  hood-Model XM2S-0911 (OMRON),
  lock-Model XM2Z-0001 (OMRON)
  <Link unit side> plug-Model XM2A-0901 (OMRON),
  hood-Model XM2S-0911(OMRON)

CHECK!

Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

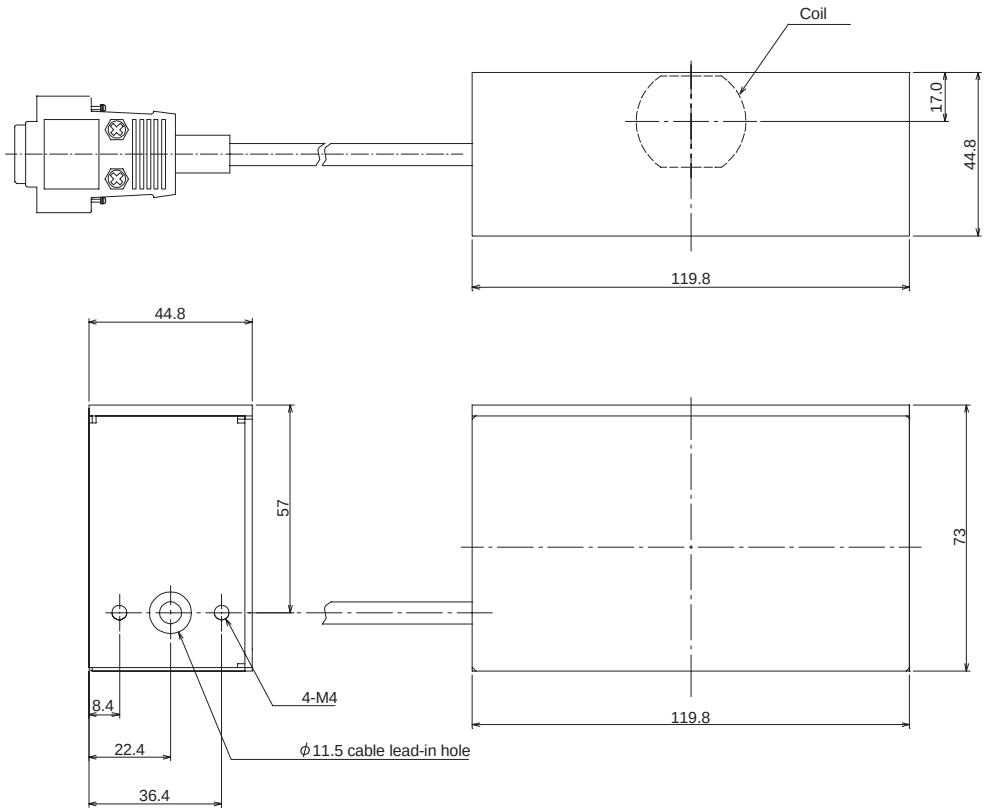
2.3.3 Dimensional drawing and mounting method

● IDR/W head with mounting brackets installed

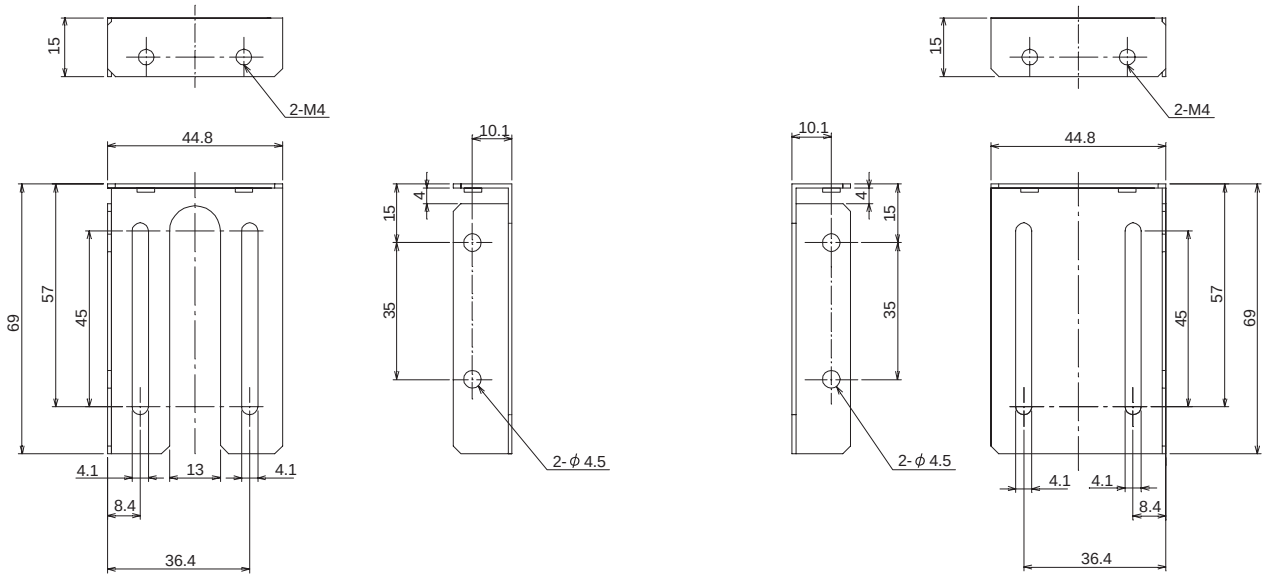


Case sideplate	Aluminum plate (A5052P)	(Unit: mm)
Communication area on case	Bakelite	
Mounting bracket	SUS 304 (t=1.0)	
Cable	PVC cable	

● IDR/W head proper

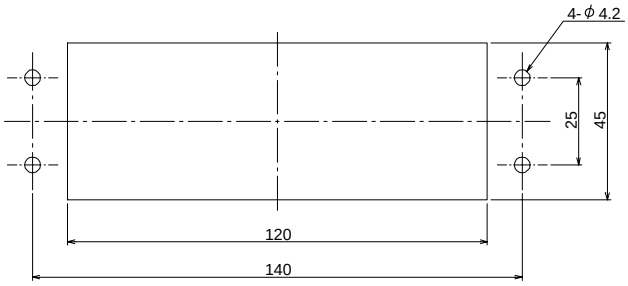


● Mounting brackets

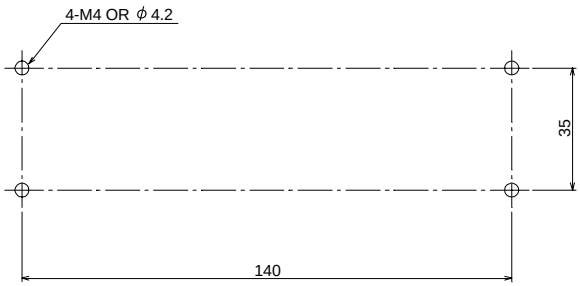


● Mounting hole dimensional drawing

Mounting holes dimensions (top mounting configuration)



Mounting holes dimensions (front mounting configuration)



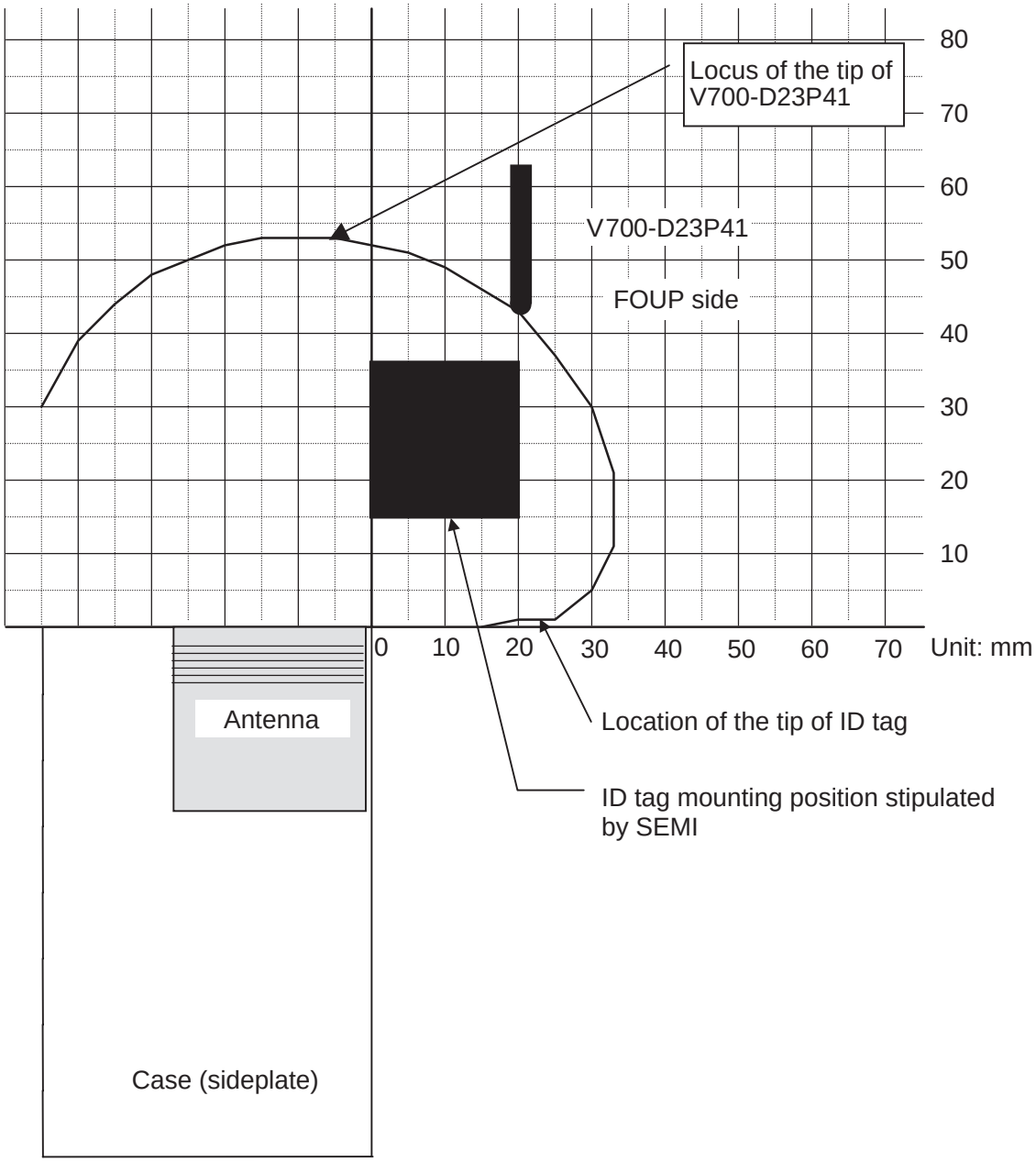
* Be sure to limit the tightening torque for the M4 screws and bracket mounting screws to 1.2 N-m or less.

CHECK!

In the installation work, do not exert an excessively strong force to the case or deform the case. Otherwise, the IDR/W head may fail to perform as designed.

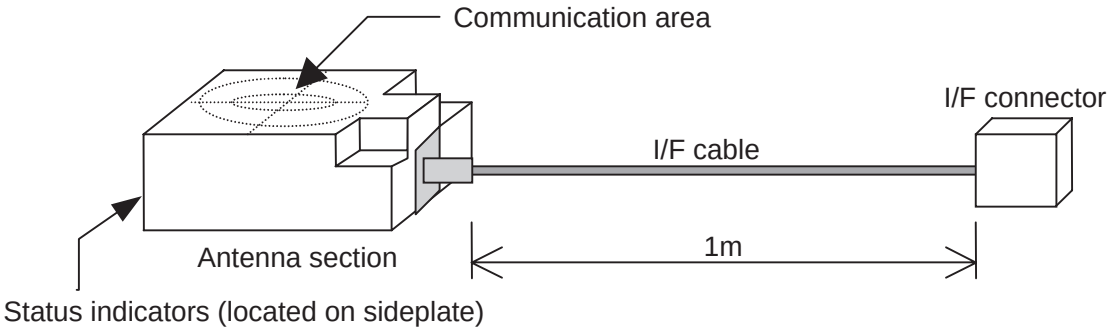
2.3.4 Communication performance (information only)

Communication area (Model V700-HMD13□ vs. Mode V700-D23P41)



2.4 IDR/W head: Model V700-HMD11-1

2.4.1 Names and functions of various components/specifications



● Antenna section

This section reads or writes data from or into an ID tag.

● I/F connector

This interface connector supplies power to IDR/W head, and permits data transmission with an upstream controller.

● Status indicators

Green	Remains lit during data transaction with an ID tag.
Red	Lights if data transaction with an ID tag has failed to complete normally.

■ General specifications

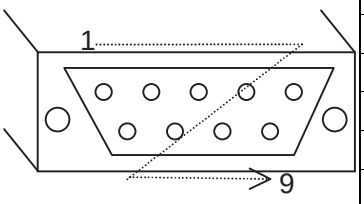
Characteristic	Specification	Comment
Supply voltage	5 VDC±5%	Supplied from the I/F connector
Current consumption	250 mA max.	When 5 VDC is input: approx. 4 A with rush current
Dimensions	40 × 53 × 23 mm	Except for cable
Cable length	1 m (dia. 6 mm)	Can be extended to 4 m in conjunction with Model V700-L11
Protection class	IP67 (per IEC 60529) IP67G (per JEM 1030)	The connector is not resistant to water or oil.
Operating ambient temperature	–10 to +55°C	No freezing
Operating ambient humidity	25 to 85%RH	No dew condensation
Storage ambient temperature	–25 to +65°C	No freezing
Storage ambient humidity	25 to 95%RH	No dew condensation
Mounting system	Screwed down at two points with M4.	Capable of mounting to sheet metal*

* Be sure to ground the sheet metal that accepts the IDR/W head by class D earth work (grounding resistance of 100 Ω or less, diameter of grounding conductor of 1.6 mm or greater).

2.4.2 Interface specifications (same as with Model V700-HMD13☐)

Characteristic	Specification
Connector specification	9-pin D-SUB connector plug, with M2.6 lock screws
Communication standard	RS-232C

(Pin arrangement)



Pin No.	Signal name	Symbol	Direction	Comment
1				
2	Send data	SD	Input	
3	Receive data	RD	Output	
4	Request send	RS	Input	
5	Clear to send	CS	Output	Normally ON
6	+5 V input	5V	Input	5 VDC±5%
7	0 V input	0V	Input	Internally connected to SG
8				
9	Signal ground	SG	–	Internally connected to 0V

<Connection with link unit>

The IDR/W head can be directly connected to the ID connection port on the link unit. When considering extending the cable, use the cable whose configuration is specified below. Limit the whole cable length to 4 m.

Link unit D-SUB 9-pin plug M2.6	Symbol	Pin No.		Pin No.	Symbol	IDRWH D-SUB 9-pin socket M2.6 nut
		1		1		
	SD	2	→	2	SD	
	RD	3	←	3	RD	
	RS	4	→	4	RS	
	CS	5	←	5	CS	
	5V	6	→	6	5V	
	0V	7	* →	7	0V	
		8		8		
	SG	9	→	9	SG	

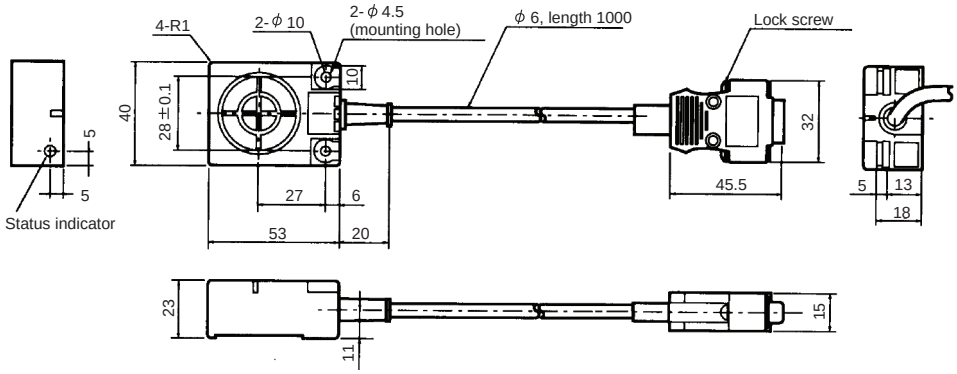
* For the 5 V/0 V power line, use a cable whose conductor size is AWG22 or greater.

- Recommended cable:OTSC-8PVB-2 No. 22AWG (Onamba)
- Recommended connector: <IDRWH side> socket-Model XM2D-0901 (OMRON), hood-Model XM2S-0911 (OMRON), lock-Model XM2Z-0001 (OMRON)
  <Link unit side> plug-Model XM2A-0901 (OMRON), hood-Model XM2S-0911(OMRON)

CHECK! Wrong wiring connection can lead to a malfunction of the equipment. Be fully sure of the correct wiring connections.

2.4.3 Dimensional drawing and mounting method

Model V700-HMD11-1

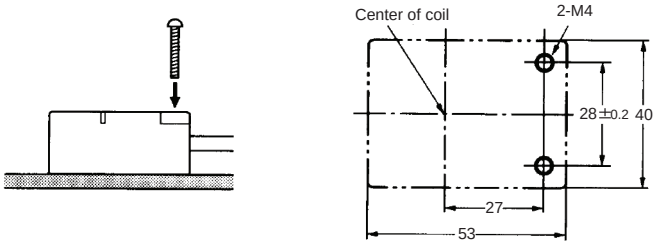


Case material	ABS resin
Filler resin	Epoxy resin
Cable	PVC (oil-resistant)

(Unit: mm)

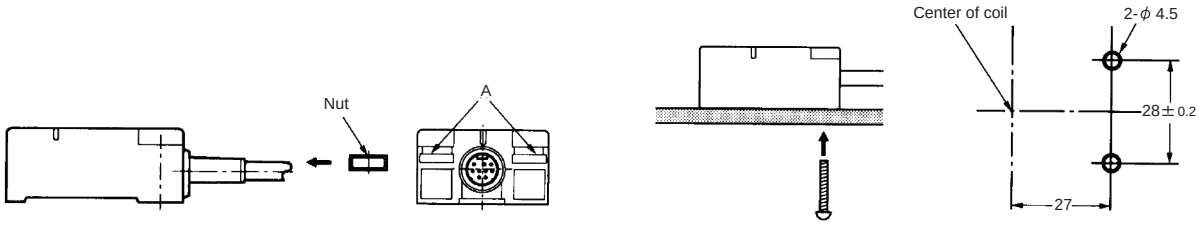
■ Mounting method

(1) Front mounting



(2) Back mounting

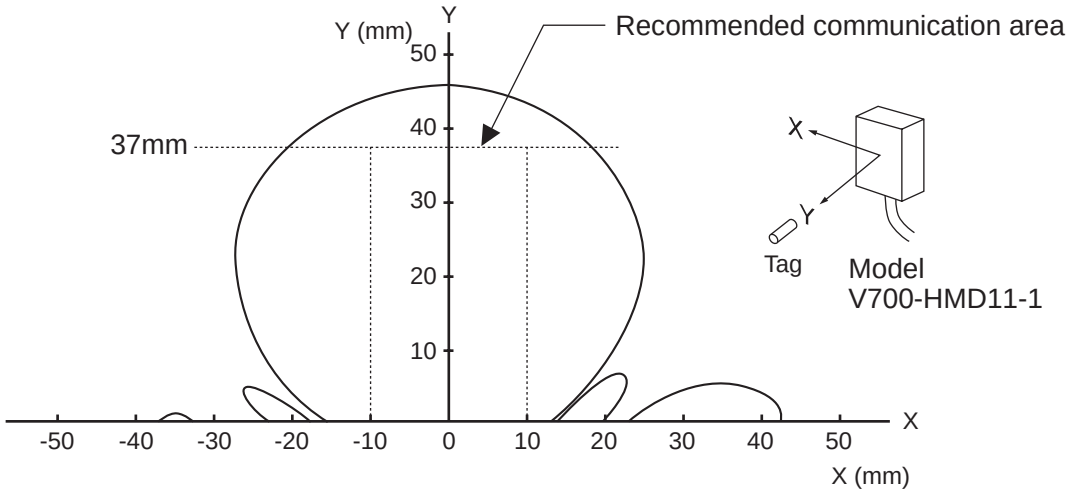
Insert the enclosed nuts into areas A, and mount the head.



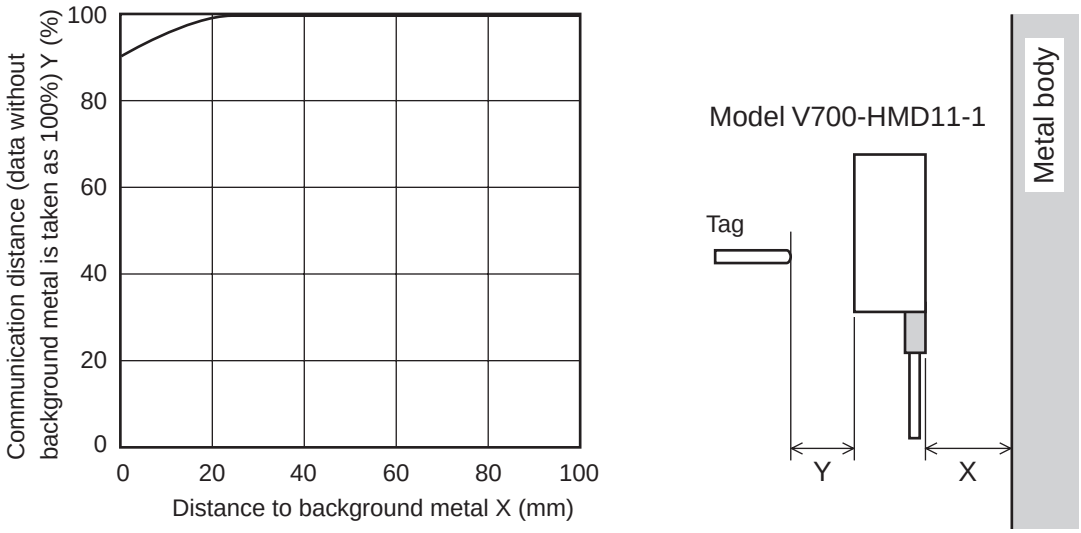
* Be sure to limit the tightening torque for the M4 screws to 1.2 N-m or less.
Do not apply an organic solvent such as thread glue to the threads. Otherwise, cracking can occur on the case.

2.4.4 Communication performance (information only)

● Communication area (Model V700-HMD11-1 vs. Mode V700-D23P41)



● Effect of background metal (Model V700-HMD11-1 vs. Mode V700-D23P41)



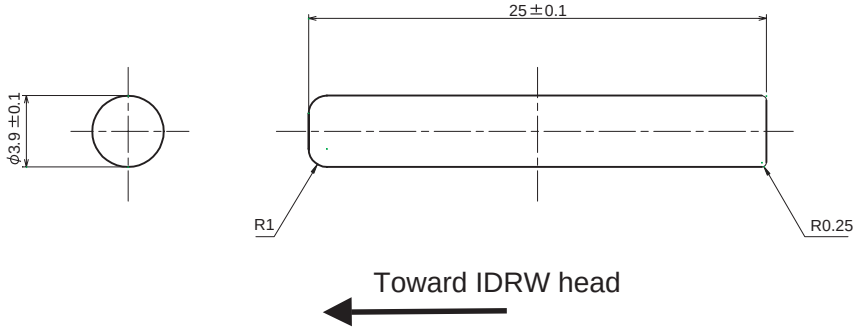
2.5 ID tag: Model V700-D23P41

2.5.1 Dimensional drawing and specifications

■ General specifications

Characteristic	Specification
Memory capacity	240 bytes (user area)
Memory type	EEP-ROM
Data retention time	10 years after data writing
Number of overwrites	100,000 times per address
Operating ambient temperature	–25 to +70°C (no freezing)
Operating ambient temperature	–40 to +110°C(no freezing)
Storage ambient temperature	–40 to +110°C (no freezing)
Operating ambient humidity	35 to 95%RH (no dew condensation)
Protection rating(IEC 60529)	IP67
Vibration resitance	Endurance 10 to 2000 Hz, single amplitude 0.75 mm Acceleration of 150 m/s^2 is applied in each of X, Y and Z directions each for 15 minutes, and this sequence is repeated 10 times, thereby the ID tag must not develop any irregularity.
Shock resistance	An impact, that is, acceleration of 500 m/s^2, is applied three times in each of X, Y and Z directions, and this sequence is repeated 18 times, thereby the ID tag must not develop any irregularity.
Materials	Case: PBT resin, filler: epoxy resin
Mass	Approx. 1 g

■ Dimensional drawing



CHECK! The ID tag Model V700-D32P41 has directionality, and its communication performance varies depending on how it is oriented. Therefore, be sure to use it in correct orientation.

2.5.2 Memory map

The carrier IDs and data segments are assigned to the following memory addresses in an ID tag.

Page	8 bytes/page								DATASEG	LENGTH
1	00h	01h	02h	03h	04h	05h	06h	07h	Carrier ID (16 byte)	16
2	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh		
3	10h	11h	12h	13h	14h	15h	16h	17h	"S01"	8
4	18h	19h	1Ah	1Bh	1Ch	1Dh	1Eh	1Fh	"S02"	8
5	20h	21h		···	···			27h	"S03"	8
6	28h	29h		···	···			2Fh	"S04"	8
7	30h	31h		···	···			37h	"S05"	8
8									"S06"	8
9									"S07"	8
10	:							:	"S08"	8
11	:							:	"S09"	8
12									"S10"	8
13									"S11"	8
14	68h	69h		···	···			6Fh	"S12"	8
15	70h	71h		···	···			77h	"S13"	8
16	78h	79h		···	···			7Fh	"S14"	8
:	:							:	:	8
:	:							:	:	8
27	D0h	D1h		···	···			D8h	"S25"	8
28	D8h	D9h		···	···			DFh	"S26"	8
29	E0h	E1h		···	···			E7h	"S27"	8
30	E8h	E9h	EAh	EBh	ECh	EDh	EEh	EFh	"S28"	8

Data area (total 224 bytes)

* When the Model V700-HMD13 is used in the CIDWR system, the data segments assigned to pages 13 through 30 have operational limitations. For further information, refer to "Limitations about Model V700-HMD13" in the earlier part of this manual. The Model V700-HMD13A does not have such limitations.

MEMO

Section3
System Connections

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3.2 System configuration example	39

3.1 Connection work and startup

① Connect the CIDRW controller to an upstream controller (equipment controller, etc.) with an RS-232C cable. The maximum allowable cable length is limited to 15 m. According to the intended CIDRW system configuration, choose the protocol parameters for the CIDRW controller and Baud rate for communications with the link unit. Parameter setting can be achieved in setup mode.

② Connect the CIDRW controller to the link unit with an RS-232C cable. The maximum allowable cable length is limited to 15 m. Determine the DIP-SW setting so that the Baud rate for the link unit is same as that for the CIDRW controller.

③ Connect the IDRW head to the link unit. (A pair of mutually connected IDRW head and link unit is simply called "head".) The IDRW head is powered by the link unit. If the cable needs to be extended, use a straight cable as an extension cable. The maximum allowable cable length is 4 m (maximum 3 m for an extension cable).

④ In a multi-head application, connect the heads in multidrop arrangement per RS-485. The maximum allowable total cable length is 50 m.

⑤ Using the setup DIP-SW on the link unit, define the node Nos. and enable/disable the terminators. Each node, up to the highest number of node, is assigned with a unique ID No. beginning with 1. Set the terminator setting to ON for the link units on both ends of multidrop, and to OFF for other units. In the case of single-head configuration, set the terminator setting for the link unit in question to OFF.

⑥ When the CIDRW system is power UP with its equipment connected, the CIDRW controller checks the system by detecting the status of the connected heads, then the CIDRW system becomes ready for service. Once the CIDRW is started without problems, the status indicators on the CIDRW controller will appear as follows:

OPERATING	ALARMS	BUSY	ERROR
○	●	●	●

○: Lit, ●: Unlit

<Detection of heads>

The following two schemes are possible for automatic recognition of heads. Either scheme can be chosen in the setup mode. The factory-setting is "auto count".

① Auto count: A number of detected heads is taken as "number of heads".
Regardless of the variation in currently connected heads, the number of heads is automatically recognized.

② Specified number of heads: A number of detected heads (1 to 31) is compared with a specified number.
By this choice, it is possible to detect a fault (ALARMS) if the number of active heads varies owing to, for example, failed heads.

If a particular head is disconnected or a fault is detected with a connected head, and, as a result, a number of detected heads does not match a specified number, an alarm is triggered.

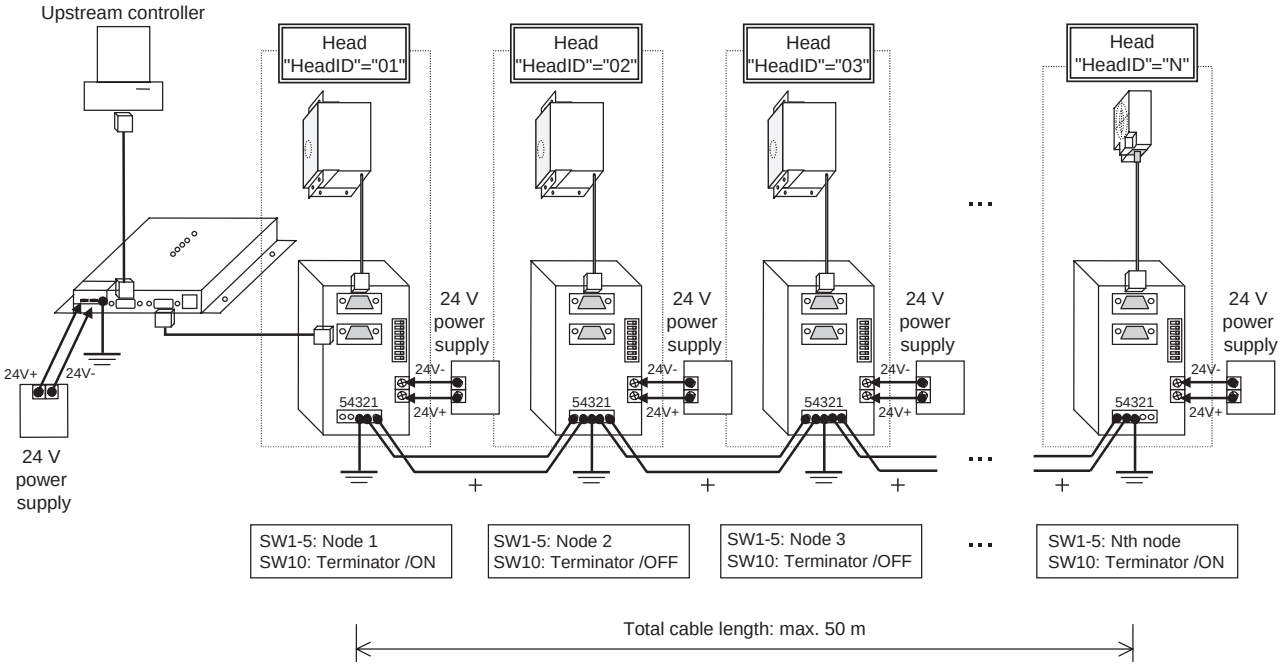
OPERATIONG	ALARMS	BUSY	ERROR
○	○	●	●

○: Lit, ●: Unlit

When attempting to change the mode switch setting on CIDRW controller or set up the DIP-SW on link unit, or connect a cable, turn OFF the power supply to the CIDRW system. Next, make fully sure that the intended settings and connections are correct, and only then, power ON the system again.

3.2 System configuration example

A typical example of a CIDRW controller connected to a plurality of heads is given below.



MEMO

Section 4
SECS Protocol Specifications

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4.1 Operation model

Set the MODE switch to 0 position, and power UP the CIDRW system. The CIDRW system is then initialized, and then acts according to the state models defined in SEMI E99.

(1) CIDRW state model

OPERATIONAL status	OPERATING		The system is running in operating mode.
		IDLE	No service is performed on any head.
		BUSY	A service is performed on any head.
	MAINTENANCE		The system is running in maintenance mode. * The service will vary by change of state commanded by the host.
ALARM status	NO ALARMS		No alarm condition exists on the CIDRW controller and all the connected heads.
	ALARMS		An alarm condition exists. • In the head detection process during initializing, a faulty head has been detected or no head has been detected at all. (This state is cleared only when the system is powered OFF and ON again, and correct head connection is detected.) • During data transaction with an ID tag, a faulty head has been detected. (Correct state is automatically restored when in the ensuing action, the faulty state is found to have been cleared.) • Internal error on CIDRW controller has occurred.
INITIALIZING			A state where after powering UP, the CIDRW is initializing or detecting heads, before the CIDRW system can function as intended.

(2) IDRW head state model

OPERATIONAL status	OPERATING		The head is normally running.
		IDLE	No service is performed on any head.
		BUSY	A service is performed on any head.
	NOT OPERATING		The heads (IDRW heads, link units) needs to be checked for correct functioning. * The alarm status with CIDRW is ALARMS.

4.2 Protocol specifications

(1) Character structure

Start bit (1) + data bits (8) + stop bit (1) *Per SEMI E4

(2) Protocol parameters

No.	Symbol	Name	Default	Range	Resolution
1	BAUD	Baud rate	9600	1200,2400,4800,9600,19200, 38400,57600,115200 bps	-
2	DEVID	Device ID	0	0 - 32767	1
3	T1	Inter-character timeout	0.5s	0.1 - 10s	0.1s
4	T2	Protocol timeout	10s	0.2 - 25s	0.2s
5	T3	Replay timeout	45s	1 - 120s	1s
6	T4	Inter-block timeout	45s	1 - 120s	1s
7	RTY	Retry limit	3	0 - 31	1
8	M/S	Master/slave	Master	-	-

(3) Duplicate block detection

The header of correct block received immediately before is compared with that of currently received block in order to detect a duplicate block. Whether or not this detection is enabled can be set in setup mode.

(4) Multiblock

The receiver side supports multiple blocks (max. 128 blocks).

The transmitter side uses multiple blocks.

(5) Message size

The maximum size of a message that can be received is 32 kbytes.

(6) Interleaving

The receiver side supports interleaving and block interleaving.
The transmitter side uses interleaving and block interleaving.
The maximum number of simultaneously opened transactions is 16.
If this maximum number is exceeded, an SxF0 (abort transaction) signal is triggered.

(7) Device ID

The number of device ID used is one, and a device ID is specified in setup mode.

(8) Block No.

In the single block case, the block No. is 1 or 0. In the multi-block case, the possible block No. ranges from1 to 128. The block No. for single block case is specified in setup mode.

(9) Handling of system bytes

A system byte consists of a source ID and a transaction ID.

A source ID is a fixed value and is specified in setup mode.

The initial value of transaction ID is 1, and the maximum value is 0xFFFF. A transaction ID is incremented every time a primary message is transmitted.

(10) Stalling

The type of stalling when BUSY state is present owing to internal buffer FULL, etc., is "NAK transmit".

(11) Action after timeout detection

T3 or T4 timeout is reported by means of S9F9 message.

■ SECS parameters

Parameter	Default	Range	Resolution
Dual block detection	1: Perform	1: Perform, 0: Not perform	—
Source ID	0	0 - 32767	1
Single block No.	1	0, 1	—

4.3 Support attributes

(1) CIDRW attributes

Attribute name	Description	Access	Requested	Form
Fundamental				
Configuration	Number of heads	RO	Y	20 "00"-"31" Number of heads connected at the time of powering ON the CIDRW system (automatic recognition)
Alarm Status	Current CIDRW substate of ALARM STATUS	RO	Y	20 0=NO ALARMS 1=ALARMS
Operational Status	Current CIDRW substate of OPERATIONAL	RO	Y	20 "IDLE" "BUSY" "MANT"
Software Revision Level	Revision (version) of software	RO	Y	20 6byte "VVV.RR" * VVV= version, RR=revision
Optional				
Date Installed	Date where the sub-system was installed	RW	N	20 8byte Factory setting is " " (spaces)
Device Type	Identifies subsystem as either CIDR or CIDRW.	RO	N	20 5byte "CIDRW"
Hardware Revision Level	Revision (version) of hardware	RO	N	20 6byte "VVV.RR" * VVV=version, RR=revision
Maintenance Data	Supplier dependent	RW	N	20 80byte Factory setting is " " (spaces)
Manufacturer	The name or ID of the manufacturer	RO	N	20 17byte "OMRON Corporation"
Model Number	The manufacturer's model designation	RO	N	20 6byte "L21 "
(SerialNumber)	Subsystem serial number assigned by the manufacturer	RO	N	20 max. 20 bytes * Not yet supported with this CIDRW system

(2) Reader/Writer head attribute definitions

Attribute name	Description	Access	Requested	Form
Fundamental				
Head Status	Current state	RO	Y	20 "IDLE" "BUSY" "NOOP"
Head ID	Head number 1-31	RO	Y (multi)	20 "01"-"31" * "00" represents the CIDRW itself, and must not be used.
Optional				
Cycles	Number of read and write operations performed	RO	N	54 (4-byte unsigned integer) * Not yet supported with this CIDRW system
Head Condition	Current maintenance status	RO	N	20 NO: no alarms NM: Needs maintenance. RW: Read/write fault RT: Read/write rate fault * Not yet supported with this CIDRW system NP: No power or connection error
(Head Date Installed)	Date this head was installed	RO	N	20 "YYYYMMDD" * Not yet supported with this CIDRW system
(Head Maintenance Data)	Supplier dependent	RO	N	20 * Not yet supported with this CIDRW system

4.4 Message specifications

(1) Message list

S	F	Direction	Name per SECS II
1	0	S,H←E	Abort transaction
1	1	S,H→E,reply	On line acknowledge request
1	2	S,H←E	On line data
9	0	S,H→E	Abort transaction
9	1	S,H←E	Unrecognized device ID
9	3	S,H←E	Unrecognized stream type
9	5	S,H←E	Unrecognized function type
9	7	S,H←E	Illegal data
9	9	S,H←E	Transaction timer timeout
9	11	S,H←E	Data too long
18	0	S,H←E	Abort transaction
18	1	S,H→E,reply	Read attribute request
18	2	S,H←E	Read attribute data
18	3	S,H→E,reply	Write attribute request
18	4	S,H←E	Write attribute acknowledge
18	5	S,H→E,reply	Read request
18	6	S,H←E	Read data
18	7	S,H→E,reply	Write data request
18	8	S,H←E	Write data acknowledge
18	9	S,H→E,reply	Read ID request
18	10	S,H←E	Read ID data
18	11	S,H→E,reply	Write ID request
18	12	S,H←E	Write ID acknowledge
18	13	S,H→E,reply	Subsystem command request
18	14	S,H←E	Subsystem command acknowledge

(2) Data item dictionary

SECS II data item	Name	Format	Value
ATTRID	Attribute ID	20	Attribute name
ATTRVAL	Attribute value	20	Attribute value
MID	Carrier ID	20 (16 bytes fixed)	All characters 00H-0FFH
DATA	Data	20 (8 bytes fixed)	All characters 00H-0FFH
DATALENGTH	Data size	52	8 (fixed)
DATASEG	Data segment	20	"S01", "S02",···"S27", "S28"
STATUS	PMInformation	20	NE: normal (fixed)
SSACK	Result information	20	NO: normal EE: execute error *3 CE: communication error HE: hardware error*3 TE: tag error *3
List of STATUS	Status	L,4 1.<PM Information> 2.<Alarm Status> 3.<Operational Status> 4.<Head Status> *2	PM Information contains the STATUS value.
CPVAL	State request parameter	20	"OP", "MT", "PS" *1
TARGETID	Target ID	20	"00"-"31" * "00" represents the CIDRW controller itself.
SSCMD	Subsystem command	20	"Change State" "Get Status" "Perform Diagnostics" "Reset"

*1: "PS" is an extension command of the CIDRW system.

*2: Will be zero-length item if TARGETID is "00" (CIDRW).

*3: "EE", "HE" and "TE" are used only for S18F6, S18F8, S18F10 and S18F12.

<About S9F7 response>

When a message with an illegal format from the upstream controller is received, the S9F7 is returned to the upstream controller. "Illegal format" refers to a one whose message structure has a problem such as an illegal attribute, or excessive or insufficient items. In the case of problematic item content, SSACK = "CE" (communications error) will be returned to the upstream controller.

(3) Stream/function specifications

S1,F1	On line acknowledge request	S,H→E,reply
		Header only

S1,F2	On line data	S,H←E
L,2		
	1.<MDLN>	
	2.<SOFTREV>	

• Defines an MDLN = Model Number.
• Defines SOFTREV = Software Revision Level.

S18,F1	Read attribute request	S,H→E,reply
L,2		
	1.<TARGETID>	"00"-"31"
	2.L,n	
	1.<ATTRID1>	
	.	
	n.<ATTRIDn>	

• If all the attributes (CIDRW controller or head) are to be read, then set n=0.

S18,F2	Read attribute data	S,H←E
L,4		
	1.<TARGETID>	"00"-"31"
	2.<SSACK>	
	3.L,n	
	1.<ATTRVAL1>	
	.	
	n.<ATTRVALn>	
	4.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• The order of attribute data is in accordance with the attribute ID defined by S18 and F1.
  * If reading of all attributes is specified, then unsupported attributes (ATTRVAL) are skipped.
• When specified target is invalid:
  n=0, s=0, SSACK = CE (communications error)
• When one or more undefined attributes are included:
  n=0, s=0, SSACK = CE (communications error)
• If target =00 and when head attribute is specified, or the CIDRW controller attribute is specified with target < >00:
  n=0, s=0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F3	Write attribute request	S,H→E,reply
L,2		
	1.<TARGETID>	Fixed at "00"
	2.L,n	
	1.L,2	
	1.<ATTRID1>	
	2.<ATTRVAL1>	
	n.L,2	
	1.<ATTRIDn>	
	2.<ATTRVALn>	

• Since all the HEAD attributes with the CIDRW are R0, the TARGETID is fixed at "00".

S18,F4	Write attribute acknowlegde	S,H←E
L,3		
	1.<TARGETID>	Fixed at "00"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid (head):
s=0, SSACK = CE (communications error)
• When one or more undefined attributes or R0 attributes are included:
s=0, SSACK = CE (communications error)
• When illegal attribute data is specified:
s=0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F5	Read request	S,H→E,reply
L,3		
	1.<TARGETID>	"01"-"31"
	2.<DATASEG>	
	3.<DATALENGTH>	

- If all the data of all segments are requested as a block, both DATASEG and DATALENGTH must be zero length items.
- If all the data in a particular segment is requested, DATALENGTH alone is omitted (zero length item or zero).
- When specifying DATASEG and DATALENGTH, it is impossible to choose a DATALENGTH that exceeds the maximum allowable length of that DATASEG.
- If DATALENGTH whose length is shorter than DATASEG is specified, the data corresponding with that DATALENGTH only is read.

S18,F6	Read data	S,H←E
L,4		
	1.<TARGETID>	"01"-"31"
	2.<SSACK>	
	3.<DATA>	
	4.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

- When the specified target is invalid:
  DATA item length=0, s=0, SSACK = CE (communications error)
- When an undefined DATASEG is specified, or DATALENGTH is illegal:
  DATA item length=0, s=0, SSACK = CE (communications error)
- When reading of all segment data is instructed for a system whose data segments have not yet been defined:
  DATA length=0, SSACK = NO
- When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F7	Write data request	S,H→E,reply
L,4		
	1.<TARGETID>	"01"-"31"
	2.<DATASEG>	
	3.<DATALENGTH>	
	4.<DATA>	

- If all the data of all segments are requested as a block, both DATASEG and DATALENGTH must be zero length items.
- If all the data in a particular segment is requested, DATALENGTH alone is omitted (zero length item or zero).
- When specifying DATASEG and DATALENGTH, it is impossible to choose DATALENGTH that exceeds the maximum allowable length of that DATASEG.
- When a DATALENGTH shorter than the preset length of DATASEG is specified, the data corresponding to that DATALENGTH is written into a lower address.
- The DATALENGTH must coincide with the DATA item length.
- If both DATASEG and DATALENGTH are set to zero length items, the DATA length must coincide with the sum of all the segments.

S18,F8	Write data acknowledge	S,H←E
L,3		
	1.<TARGETID>	"01"-"31"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

- When the specified target is invalid:
  s=0, SSACK = CE (communications error)
- When DATASEG or DATALENGTH is illegal:
  s=0, SSACK = CE (communications error)
- When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F9	Read ID request	S,H→E,reply
1.<TARGETID>		"01"-"31"

S18,F10	Read ID data	S,H←E
L,4		
	1.<TARGETID>	"01"-"31"
	2.<SSACK>	
	3.<MID>	
	4.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid:
s=0, MID item length = 0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F11	Write ID request	S,H→E,reply
L,2		
	1.<TARGETID>	"01"-"31"
	2.<MID>	

• If an MID is defined which is shorter than the preset ID length, the data is written in a lower address, and the NULL (0×00) string is written as remaining data.

S18,F12	Write ID acknowledge	S,H←E
L,3		
	1.<TARGETID>	"01"-"31"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid:
s=0, SSACK = CE (communications error)
• When the MID length is faulty:
s=0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F13	Subsystem command request (ChangeState)	S,H→E,reply
L,3		
	1.<TARGETID>	Fixed at "00"
	2.<SSCMD>	"Change State"
	3.L,1	
	1.<CPVAL1>	"OP", "MT", "PS"

• CPVAL1="PS" is a parameter unique to OMRON CIDRW controller, and is used to access setup mode.

S18,F14	Subsystem command acknowledge (ChangeState)	S,H←E
L,3		
	1.<TARGETID>	"00"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid:
s=0, SSACK = CE (communications error)
• When SSCMD is invalid:
s=0, SSACK = CE (communications error)
• When the Operational Status is BUSY:
s=0, SSACK = EE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F13	Subsystem command request (GetStatus)	S,H→E,reply
L,3		
	1.<TARGETID>	"00"-"31"
	2.<SSCMD>	"GetStatus"
	3.L,0	

S18,F14	Subsystem command acknowledge (GetState)	S,H←E
L,3		
	1.<TARGETID>	"00"-"31"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid:
s=0, SSACK = CE (communications error)
• When SSCMD is invalid:
s=0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F13	Subsystem command request (PerformDiagnostics)	S,H→E,reply
L,3		
	1.<TARGETID>	"00"-"31"
	2.<SSCMD>	"Perform Diagnostics"
	3.L,0	

S18,F14	Subsystem command acknowledge (PerformDiagnostics)	S,H←E
L,3		
	1.<TARGETID>	"00"-"31"
	2.<SSACK>	
	3.L,s	
	1.<STATUS1>	
	.	
	s.<STATUSs>	

• When the specified target is invalid:
s=0, SSACK = CE (communications error)
• When SSCMD is invalid:
s=0, SSACK = CE (communications error)
• When SSACK is other than NO (normal), the List of Status will take a list structure with which the number of items is 0.

S18,F13	Subsystem command request (Reset)	S,H→E,reply
L,3		
	1.<TARGETID>	Fixed at "00"
	2.<SSCMD>	"Reset"
	3.L,0	

S18,F14	Subsystem command acknowledge (Reset)	S,H←E
L,3		
	1.<TARGETID>	"00"
	2.<SSACK>	
	3.L,0	

• When the specified target is invalid:
s=0, SSACK = CE (communications error)
• When SSCMD is invalid:
SSACK = CE (communications error)

4.5 Operating conditions

The acknowledge messages and acknowledge codes (SSACK) for various states are listed below:

State		Initializing	Operating		Maintenance
Message	Function		IDLE	BUSY	
S1,F1	Online Request	S1,F0	S1,F2	S1,F2	S1,F2
S18,F11	Write ID	S18,F0	S18,F0	S18,F0	NO
S18,F7	Write Data	S18,F0	NO	NO	S18,F0
S18,F3	Set Attribute	S18,F0	NO	NO	NO
S18,F13(Reset)	Reset	S18,F0	NO	NO	NO
S18,F9	Read ID	S18,F0	NO	NO	NO
S18,F5	Read Data	S18,F0	NO	NO	S18,F0
S18,F13(Perform Diagnostics)	Diagnostics	S18,F0	NO	NO	NO
S18,F13(Get Status)	Get Status	S18,F0	NO	NO	NO
S18,F1	Get Attribute	S18,F0	NO	NO	NO
S18,F13(Change State)	Change State(to MT)	S18,F0	NO	S18,F0	S18,F0
S18,F13(Change State)	Change State(to OP)	S18,F0	S18,F0	S18,F0	NO
S18,F13(Change State)	Change State(to PS)	S18,F0	NO	S18,F0	NO

Section 5
Setup Mode

5.1 Accessing setup mode	62
5.2 How to set up parameters	63

In setup mode, the operator can define various parameters such as the operating conditions for CIDRW.

5.1 Accessing setup mode

To access the setup mode, the three methods below are available:

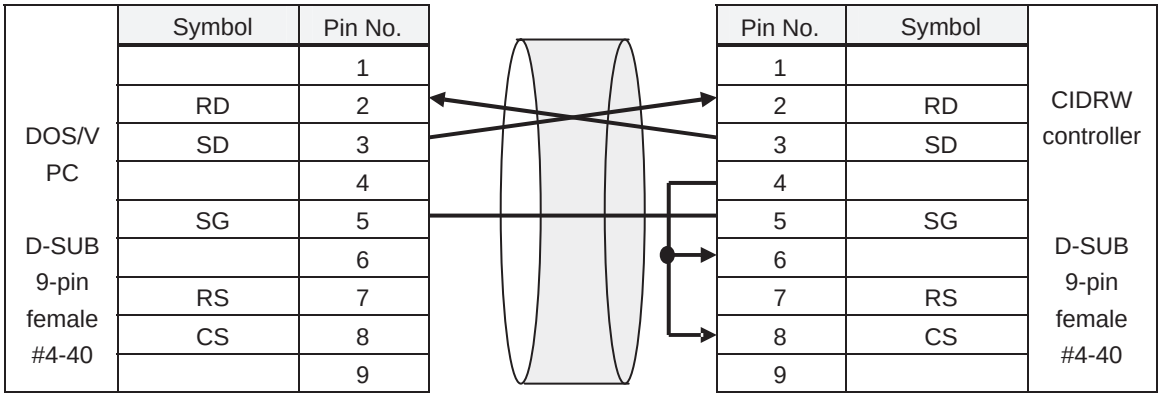
(1) Power up the CIDRW controller with its MODE switch in position 3.

(2) In normal operation mode, send a subsystem command (S18F13 Change State CPVAL1="PS") to the CIDRW controller.

∗ CPVAL1="PS" is an extended function specific to Model V700-L21 controller, and does not conform to SEMI standards.

(3) Connect the setup mode startup cable to the SECS port, and then power UP the CIDRW controller in normal operation mode (MODE switch in position 0).

<Setup mode startup cable connection>



- Recommended cable: CO-MA-VV-SB 5PX28AWG (Hitachi Cable, Ltd.)
- Recommended connector: socket-Model XM2D-0901 (OMRON), hood-Model XM2S-0913 (OMRON)

In the setup mode, the STATUS indicators will function as listed below:

Status	OPERATING	ALARMS	BUSY	ERROR
Standby for data reception (idling, with correct setup)	◎	○	○	●
Receiving data	◎	◎	○	●
Parameter setup failed	◎	○	○	○

○: Stably lit, ●: Unlit, ◎: Flashing

5.2 How to set up parameters

Various parameters are set up using a terminal software loaded into an upstream controller (PC/AT) connected to the SECS port of CIDWR controller. The communications parameters for data transaction between the upstream controller and CIDRW controller are fixed and cannot be altered on the CIDWR controller side. On the terminal software side, set up the communications parameters, transmission code, indications, etc., as listed below:

Baud rate	9600 bps
Date length	8 bit
Parity	EVEN
Stop bit	1
Communication control	None
Transmission code	Add a line feed character (LF) to the end of line (ENTER is input).
Indication	Local echo

Once entering setup mode, the basic screen below will appear on the terminal display of the upstream controller.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
```

*<"Modelnumber"><"SoftwareRevisionLevel", "HardwareRevisionLevel">

The setting-capable parameters are as listed below:

■ Parameter list

Category	Parameter	Tag name	Default	Range
Protocol	Baud rate (BAUD)	S_BAUD	9600	1200,2400,4800,9600,19200, 38400,57600,115200
Protocol	Device ID (DEVID)	S_DEVID	0	0 - 32767
Protocol	Inter-character timeout (T1)	S_T1	0.5s	0.1 - 10s
Protocol	Protocol timeout (T2)	S_T2	10s	0.2 - 25s
Protocol	Reply timeout (T3)	S_T3	45s	1 - 120s
Protocol	Inter-block timeout (T4)	S_T4	45s	1 - 120s
Protocol	Retry limit (RTY)	S_RTY	3	0 - 31
Protocol	Master/slave (M/S)	S_MS	M: Master	M: Master S: Slave
SECS	Dual block detection	S_DB	1: Perform	1: Perform 2: Not perform
SECS	Source ID	S_SRC	0	0 - 32767
SECS	Single block No.	S_BNO	1	0,1
Service	Baud rate to link unit	C_BAUD	9600	9600,19200,38400
Service	Number of heads count	C_HEAD	0	0 - 31 0 : Auto count 1 - 31 : Number of heads specified

To set up a parameter, send the following instructions from the terminal software.

Instruction	Format	Action
Parameter definition	"(Tag name)" + "=" + "(setting value)" + CR + LF	Enter the parameter for the tag name.
Parameter change	"::END"	A so far received parameter definition is checked. If the definition is found to be valid, the parameter setting is altered accordingly.
Comment	"#" + "(Comment)" + CR + LF or CR + LF	This line is ignored as a comment line.
Parameter output	"::GET_PARAM"	A predefined parameter is output.
Reset	"::EXIT"	CIDRW controller is repowered.

First, select the tag name of a parameter being altered and enter a setting value to complete [parameter definition]. Then, perform [parameter change]. To be able to alter two or more parameters, repeat [parameter definition] process the necessary number of times, and then execute [parameter change]. After completion of a setup process, a message and ERROR status indicator indicate the result (success or failure).

■ Status after setup process

Normal completion	"SETUP_COMPLETE"	ERROR ●	The selected parameter was altered as intended. The values of parameters not specified remain unchanged.
Setup failure	"SETUP_FAILED [2]"	ERROR ○	An error situation is present. The value of any parameter remains unchanged. The value in [ ] represents a line where a first error has been detected. If a parity error is contained in a received character string, this value will be 0.

○ : Lit, ● : Unlit

After successful completion of setup process, restart the CIDWR controller. As a result, the newly defined parameters will become valid. To restart, either power OFF and ON again or execute [Reset] command ("::EXIT").
To view the contents of parameters, execute [parameter output] command. All the currently valid parameter values will be displayed.

[Parameter setup example]

① Link the CIDRW controller to the upstream controller, and boot up the terminal software. Then, power UP the CIDRW controller in setup mode.CIDRW

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
_
```

② For a parameter being altered, execute parameter definition.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
S_BAUD=19200 [ENTER]
S_DEVID=1 [ENTER]
S_BNO=0 [ENTER]

_
```

* [ENTER] does not appear on the screen.

Once a first parameter is defined, the ALARMS status indicator flashes.

③ Execute parameter change process. The entered parameter is checked and written into the CIDRW controller.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
S_BAUD=19200
S_DEVID=1
S_BNO=0
::END [ENTER]
```

* [ENTER] does not appear on the screen.

④ Once setup process is complete, a message indicating the result appears.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
S_BAUD=19200
S_DEVID=1
S_BNO=0
::END
SETUP_COMPLETE
_
```

The ALARMS status indicator stably lights.

⑤ Once the whole setup procedure is successfully complete, restart the CIDRW controller in normal operating mode.

It will be convenient to create a text file such as a one shown below and transmit the file using the text file send function of the terminal (upstream controller).

Prm.txt

```
#Parameter Setting File for SystemA
#Protocol
S_BAUD=19200
S_DEVID=1
#SECS
S_BNO=0
::END
```

[Parameter check example]

① Select a parameter output being altered.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
::GET_PARAM [ENTER]
```

* [ENTER] does not appear on the screen.

② The contents of the current parameter settings will be displayed.

```
SETUP_START  <L21   ><XXX.XX,YYY.YY>
::GET_PARAM
S_BAUD=19200
S_DEVID=1
S_T1=0.5
S_T2=10.0
S_T3=45
S_T4=3
S_RTY=3
S_MS=M
S_SRC=0
S_BNO=0
C_BAUD=9600
C_HEAD=0
::END
_
```

Section 6
Reference

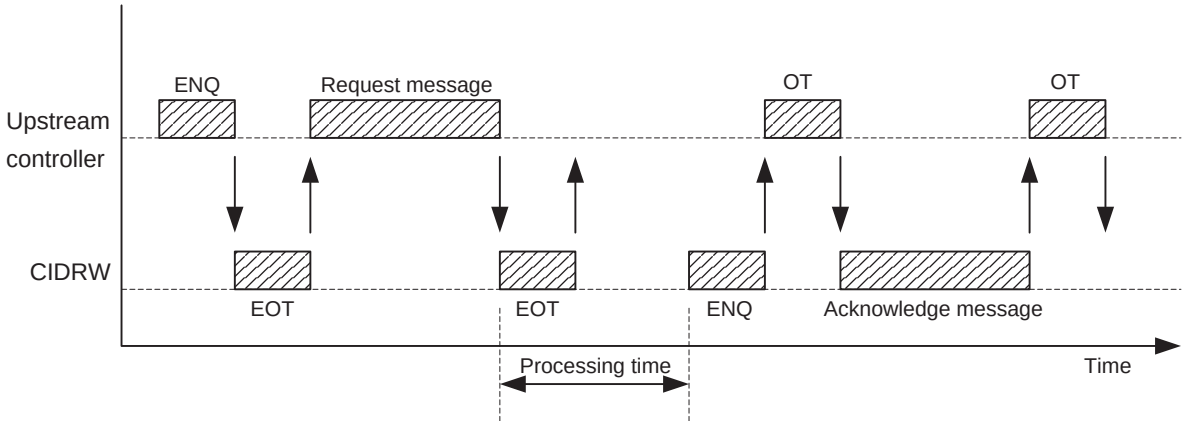
6.1 Processing Time (information only) 68

6.2 Performance Data Based on Operating Conditions (information only) 69

- 6.2.1 Effect of nearby metal object onto IDRW head 69
- 6.2.2 Spacing for installing IDRW heads 70
- 6.2.3 Effect of inclination of ID tag 71

6.1 Processing Time (information only)

As illustrated below, the processing time with OMRON CIDRW system begins with the trailing end of a request message sent from the upstream controller to the CIDWR controller and lasts until the CIDRW controller sends a request send (ENQ) to the upstream controller.



The processing time varies depending on the content of request send and current process load on the CIDRW. The processing times are listed below by request messages that were sent with no open transaction present.

Request message		Processing time [unit: ms]
Single segment read request	<S18,F5>	Approx. 900
All segments read request	<S18,F5>	Approx. 3,600
Single segment write request	<S18,F7>	Approx. 950
All segments write request	<S18,F7>	Approx. 3,900
ID read request	<S18,F9>	Approx. 950
ID write request	<S18,F11>	Approx. 1,000
No ID tag (common to all messages)		Approx. 1,200

* These values are based on the assumption that the Baud rate for the CIDRW controller and link unit is 9600 bps.

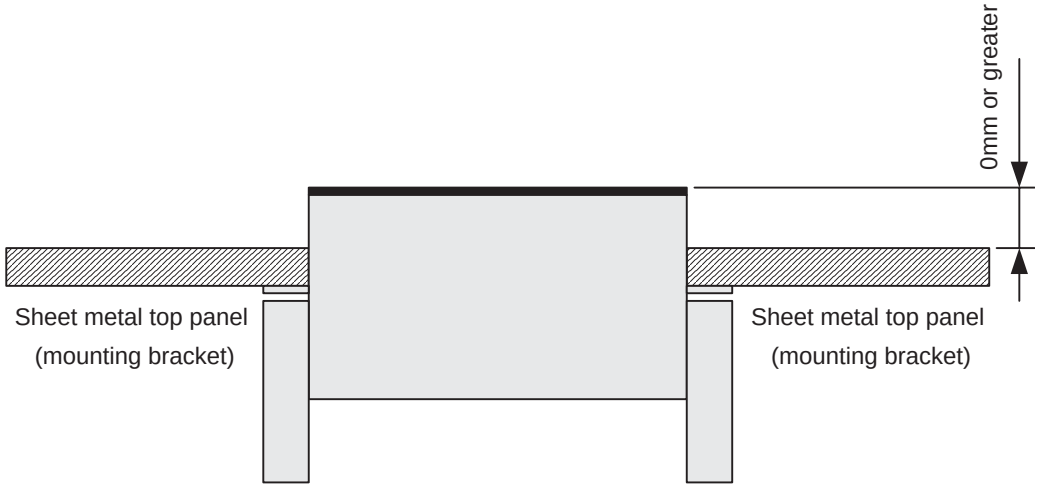
6.2 Performance Data Based on Operating Conditions (information only)

The maximum effective communication distance of an IDRW head varies depending on the operating conditions (presence/absence of a nearby metal object, spacing between the IDRW heads, etc.). This section describes the effect of varying operating conditions on the effective communication distance. Before operating the IDRW heads, study the information in this section. The values mentioned here are given only as a guideline.

6.2.1 Effect of nearby metal object onto IDRW head

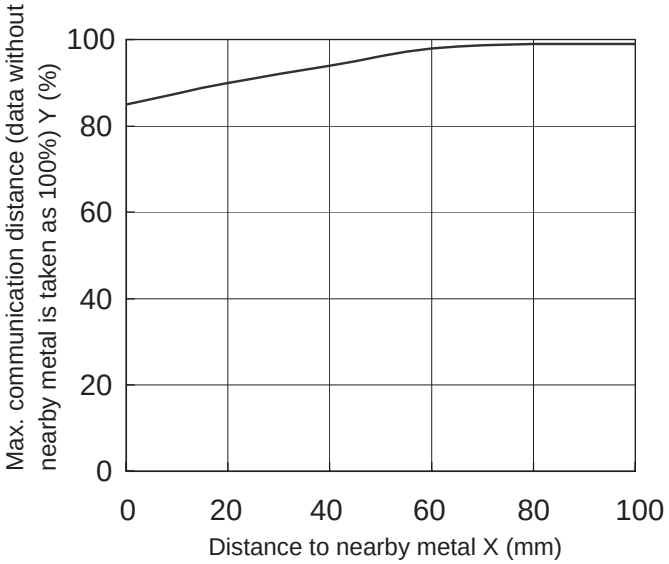
■ Model V700-HMD13☐

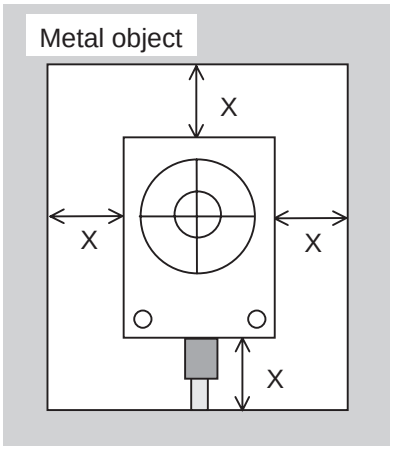
When mounting the Model V700-HMD13☐, make sure that the communication surface of IDRW head is not below the top surface of sheet metal top panel (mounting bracket). Otherwise, the effective communication distance will decrease.



■ Model V700-HMD11-1

A metal object located in the vicinity of the Model V700-HMD11-1 decreases the effective communication distance of the IDRW head. The correlation between the distance between iron object and IDRW head and the effective communication distance (read/write, misalignment of ±0 mm) is plotted below.





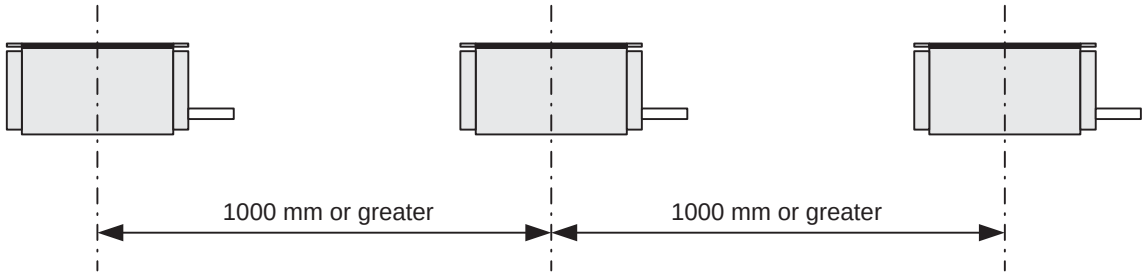
6.2.2 Spacing for installing IDRW heads

When two or more IDRW heads are connected to one CIDRW controller unit, there is no limitation on the spacing of antenna sections since all the IDRW heads do not handle a command simultaneously.

If IDRW heads in an individual CIDRW system are installed in close vicinity, and when these IDRW heads are simultaneously processing a command, mutual interference can occur across the IDRW heads, possibly leading to total inability of communication or loss in effective communication distance despite presence of tags. To avoid such a problem, be sure to install the antenna sections at the intervals specified below.

■ Model V700-HMD13□

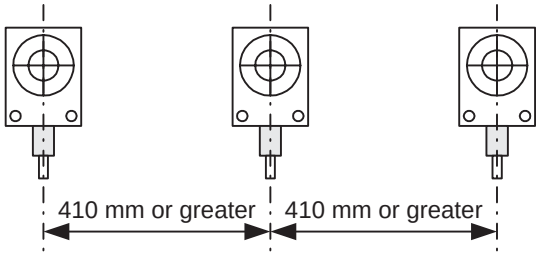
1000 mm or greater



■ Model V700-HMD11-1

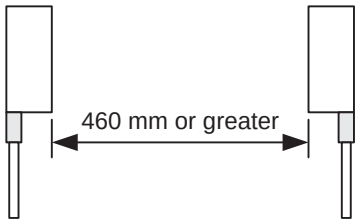
① Side-by-side configuration

410 mm or greater



② Face-to-face configuration

460 mm or greater

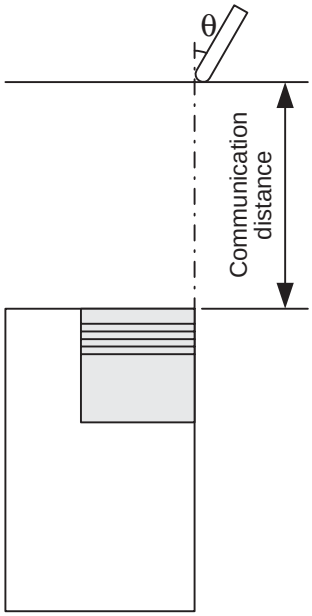


6.2.3 Effect of inclination of ID tag

Mount the IDRW head and ID tag as vertical as possible. The IDRW head or ID tag remains capable of communication even if installed inclined. However, in this situation, a shorter communication distance will result. The correlation between inclination and effective communication distance is summarized below.

■ Model V700-HMD13□

ID tag: V700-D23P41

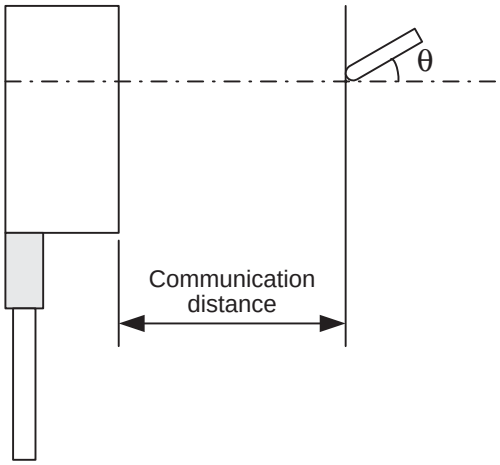


Communication distance (value with zero inclination is taken as 100%)

	Inclination of ID tag θ (degrees)				
	0	15	30	45	60
Communication distance	100%	95%	90%	85%	80%

■ Model V700-HMD11-1

ID tag: V700-D23P41



Communication distance
(value with zero inclination is taken as 100%)

	Inclination of ID tag θ (degrees)			
	0	20	40	60
Communica-tion distance	100%	96%	91%	85%

MEMO

Section 7
Troubleshooting

7.1 No acknowledge message (Acknowledge message not yet received)	74
7.2 Acknowledge message received (other than SSACK="NO")	75

If a fault should occur, first thoroughly study the symptom in order to be able to correctly judge the reproducibility of a problem, and interaction with other associated equipment. Thus, find an appropriate remedy.

7.1 No acknowledge message (Acknowledge message not yet received)

State of indicators (○: lit, ●: unlit, ◎: flashing)					Typical checkpoint
POWER	OPERATING	ALARMS	BUSY	ERROR	
●	●	●	●	●	24 VDC power supply
○	○	○	○	○	* The CIDRW controller may have been damaged. Contact the manufacturer.
○	◎	◎	◎	◎	• MODE switch setting * If the MODE switch is found to be correctly set, the CIDRW controller may have been damaged. Contact the manufacturer.
○	○	◎	◎	◎	* The CIDRW controller may have been damaged. Contact the manufacturer.
○	●	●	●	●	• MODE switch setting
○	●	●	●	○	• MODE switch setting
○	◎	○	○	●	• MODE switch setting • Cable connections (the wiring connections are configured for accessing the parameter setup mode?)
○	○	●	●	●	• MODE switch setting <MODE switch is in correct position> • Communications parameters for transactions between CIDRW controller and upstream controller (Baud rate, character structure, etc.)
○	●	●	○	●	• Node No. setting for link unit (particular node No. has been assigned to two or more link units)
(Acknowledge message is not yet verified)					
○	○	○	●	●	• MODE switch setting • Power supply to link unit • Baud rate setting for link unit • Node No. setting for link unit (particular node No. has been assigned to two or more link units) • Cable connections and wiring between CIDRW controller and link unit • Connections of IDRW heads, and wiring for extension cable • Routing of various cables (adverse effect by external noise interference)

7.2 Acknowledge message received (other than SSACK="NO")

Acknowledge	Typical checkpoint
S×F0	• Status conditions at the time a message was issued. Ex.: Write ID (S18F11) in Operating mode, or a message during initializing
S9F7	• Problematic message structure such as illegal attribute, excessive/insufficient items
SSACK="CE"	• Wrong item contents in message Ex.: Node No. as "Head ID" was assigned to a head that was not yet registered. • Connection of RS-485 cable between link units (head not yet detected) • Baud rate setting for link unit (head not yet detected) • Node No. setting for link unit (particular node No. has been assigned to two or more link units, and correct link unit cannot be detected) • Routing of cable between upstream controller and CIDRW controller (adverse effect by external noise interference) • Noise environment around the power line of CIDRW controller
SSACK="EE"	• Mounting distance and inclination between ID tag and IDRW head(s) • Noise environment around IDRW head • Spacing to IDRW head connected to another CIDRW system
SSACK="HE"	• Connection of IDRW head, and wiring connections of extension cable • Cable connection and wiring connections between CIDWR controller and link unit • Power supply to link unit • Setting of terminator on link unit • Routing of various cables (adverse effect by external noise interference) • Node No. setting for link unit (particular node No. has been assigned to two or more link units) • Noise environment around power line
SSACK="TE"	• Model and specifications of ID tag used • Setting of ID tag used (write protect, etc.) • Operating environment of tag (damaged ID tag by misoperation or misuse) • Life of ID tag in terms of number of rewrite operations (100,000 cycles)

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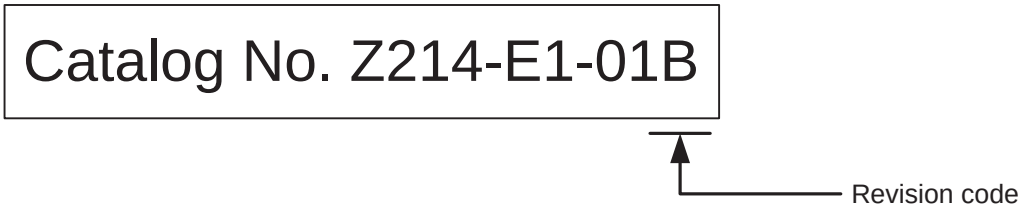
Revision History

A manual revision code is suffixed to the manual ID located to the bottom right corner of front cover and to the bottom left corner of back cover.



Revision note	Data	Revised contents
A	September 2000	1st version
B	February 2005	Warranty and liability information added to beginning of manual, signal word and alert symbols modified, and style of safety information in the body of the manual changed.

This document provides information mainly for selecting suitable models. Please read the Instruction Sheet carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

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